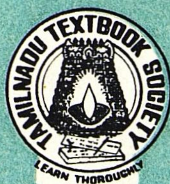
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TAMILNADU TEXTBOOK SOCIETY
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Chapter 1

LEARNING

All the living organisms both animals and human beings are constantly put through a long process of interaction with the environment. All those interactions represent various things like fulfilling the basic needs for survival, finding great amount of pleasure and happiness and avoiding painful or dangerous situations. Whether the organism is to survive or to enjoy the life or to avoid the danger it has to learn to do it successfully. The organism's effort to do any one of those tasks successfully come under the heading of the process of learning. Most of us think that learning is a process of acquiring knowledge as something that takes place in schools and colleges and simply sitting and memorising certain passage or a piece of poem. But several kinds of learnings are taking place in us all the time.

What most of us are doing ? What we are not doing ? What we are and what we are not ! What we know and what we do not know ? — are all the results of learning. Many of our every day activities like walking, talking, reading, writing, memorising a poem, typing a letter, operating a machine, opening a door, playing a piano, driving a motor-car or an aeroplane, riding a bicycle are some of the clear illustrations of learning. We learn that fire would burn our fingers and live-electric wires would give us shock and therefore we learn to avoid touching them. In this way, we learn to avoid all possible dangers to our life, understand change of weather conditions, predict the election results, learn to adjust ourselves with others and also learn to plan our future prospects. Many of our interests, likes and dislikes, beliefs, preferences, attitudes and prejudices are all

learned responses. On the whole life itself is a continuous process of learning. We learn to speak a language that enables us to communicate with others.

But the results of learning are not always doing good for us or useful for us. People often learn also to be unhappy. This is the reason why there are so many adjustment problems in our society, particularly among the educated people. We learn to hate people belonging to different culture, race or religion. Therefore, the psychology of learning plays a continuous role in the life of man whether his learning helps him or harms him in his interaction with the world in which he lives.

WHAT IS LEARNING ?

Learning is not subjected to direct observation. It is an inferred process. Learning may be defined as the process of modification of behaviour as a result of experience. Learning may also be stated as the modification of behaviour in the organism as a function of its interaction with the environment. Learning is the process by which the organism becomes able to respond more successfully or adequately to a given situation. Learning is also defined as the process by which the organism acquires experience and practice which modifies its behaviour permanently. The term learning is used in a very broader sense, covering every modification of behaviour and perception to deal with the requirements of the environment from learning simple habits like waving the hand to mean good bye to the acquisition of complex skills like playing a piano or driving an aeroplane and to formulating a philosophy of life. Man finds resources to all these things only through the process of learning.

It is very difficult to formulate a definition of learning involving all aspects of learning. But a working definition could be given in this way: learning is the process of reorganisation of an individual's perceptual,

cognitive, motivational and emotional structure which functions as a guide to more adequate and satisfying adjustments both in the specific situation and in related problem situation. This definition by Frandson appears to include most of the aspects involved in learning.

Melton and Munn define learning very precisely. According to them, learning is a change in experience or behaviour. The change is produced by purposeful observations, overt activity and related motivational and emotional responses. Experience or behaviour implies combination of perceptions, cognitions, overt actions, attitudes, motivational and emotional feelings.

Moskowitz and Orgal are of the view that learning is the ability to profit from their own experience that makes some organisms superior to others.

Fundamentally, learning is a behaviour change which is the direct result of experience rather than a consequence of inborn within the nervous system. For example, learning to play a violin and practising the new skill involves a permanent change in your behaviour. This new behaviour can be observed in you directly and can be measured. The change or modification of behaviour that takes place through learning can be observed in animals and in human beings. A dog can learn to identify his master's enemy and act quite appropriately to save his master. A rat can learn to press the lever and get its food. A cat learns to open the door in a puzzle box and comes out.

KINDS OF LEARNING

Though man has been placed in the highest place of the evolutionary process he uses the same processes in learning as those of the lower forms of animals use. But what makes him different from other animals is the learned behaviour pattern. Man's learned behaviour pattern is flexible and varied. The nature of learning

process has been discovered after more than fifty years of research work on the mechanisms of learning. After a lot of difference of opinions the present day psychologists have agreed that the learning process involves two basic forms. The two forms are different aspects of the same mechanism as all learning can be described with one set of rules. Here we shall deal with the two basic types of learned behaviour. These two basic types have some characteristics in common, but differ in other respects. The famous American psychologist B. F. Skinner (1938) had become the champion of this venture. He named the two basic types of behaviour as respondent behaviour and operant behaviour. All learning can be brought under these two types. Those who do not agree with these two types add one or two more forms of learning.

Respondent Behaviour : In this behaviour responses are elicited automatically. The responses are aroused by specific stimuli. It is a non-voluntary behaviour. The activities of smooth muscles and glands of the body are involved in this behaviour. In human beings the respondent behaviour refers to the reflex activities such as eye-winking, knee-jerk, sudden withdrawal from painful situation and so on. It also includes emotional responses of anger, fear, pleasure and so on. For example, a man is angry with his boss, or frightened by the sight of a tiger or aroused by a girl's look. At all these situations the man's emotional response is respondent behaviour unless he reacts to the situation. The parts of the body involved in these responses are controlled by neural centres that lie below the cerebral cortex. Therefore, it is assumed that respondent behaviour is related to the concept of activation or emotion.

Operant Behaviour : It is a voluntary behaviour. Operant responses are not controlled by external stimuli. It is not automatic or spontaneous type of behaviour. In operant behaviour the activities or movements of head, tongue, vocal cords, hands and legs are controlled by the

motor areas of the cerebral cortex. The responses are provided by the organism itself unlike the respondent behaviour. For example, the sight of a tiger in a garden instantly produces a fear response in a man. It is a respondent behaviour. But what the man does about the situation will be determined by several factors, such as, whether he shouts, or runs away from the situation, or attacks it or not. In the case of a child the limitation of respondent behaviour is completed during infancy and after that his operant behaviour continues throughout his life time. These two behaviours are modified by experience.

On the basis of two types of behaviour, two types of learning have been formulated. The modification of behaviour that takes place through learning can be observed in animals and human beings. In the laboratory situation the behaviour of animals can be controlled and observed carefully. When we speak of learning under controlled situations the word conditioning is often mentioned. The word conditioning is a general term often used by the psychologists. It is referred to learning of a particular response. The word conditioning is used synonymously with learning, because conditioning produces modification of behaviour. The modified respondent behaviour is named as classical (Pavlovian) conditioning and the modified operant behaviour is named as operant or instrumental conditioning.

CLASSICAL CONDITIONING

Classical conditioning is a simple type of learning. It takes place in animals as well as in human beings. Classical conditioning provides lots of information for examining the learning processes in general. Ivan Pavlov (1848-1936) a famous Russian physiologist and psychologist was the first to study the respondent behaviour in animals. He was the first to perform the quantitative and scientific investigation on the basic nature of learning process. He called the process of his investigation as 'conditioning', the respondent behaviour itself is named

as Pavlovian Conditioning. Since he was the forerunner of this kind of study he was called the father of modern behavioural psychology and his innovation is called Classical Conditioning.

Ivan Pavlov, in the year 1900 was concentrating on the activities of the salivary glands in the digestive processes of the animals as part of his physiological research. The results of his experiments on conditioning have earned for him a Nobel Prize and also changed the course of psychology all over the world. If we want to know more about conditioning and learning we must go through the details of the experimental procedures used in classical conditioning. While working on digestive processes Pavlov observed that salivation is a reflex action which can be produced by placing certain food substances on the tongue of the animal. He had also observed in several animals that salivary response can be brought under the control stimuli other than those used for salivation. His experimental animals were mainly dogs.

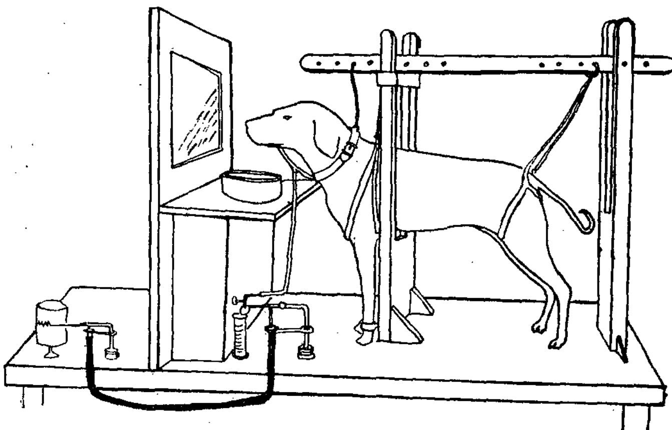


Fig-1.1 Pavlov's Experiment

In Pavlov's experimental design a hungry dog was brought into a sound proof room and placed on the table-top comfortably. The dog was placed on the table

in such a way that he was prevented from sitting or making any other gross movement. A small operation was made on the dog's cheek and a tube was attached to one of the salivary glands. Whenever the dog salivates, the saliva from the dog's mouth flows into the glass cylinder through the tube. The saliva is then measured.

Pavlov, before starting his actual procedure sounded a bell to the dog. The dog did not salivate, because there was no saliva flown in the cylinder. Then some food stuff with which the dog is familiar was placed in front of the dog. The dog, then began to salivate. The bell sound did not evoke any salivation in the dog's mouth. But the food stuff did it. The food stimulus had the effect of arousing the response — the saliva whereas the bell stimulus had no effect.

In the second stage of the experiment, the bell was sounded and after a fraction of a second food was supplied to the dog. This kind of combined presentation of the bell sound and food was repeated several times. Pavlov had observed that saliva from the dog's mouth began to flow into the cylinder on hearing the bell sound before the food was supplied to the dog. That is, the bell sound which did not evoke saliva in the dog's mouth in the first stage began to evoke saliva in the second stage, because the bell sound was combined with the food. At this stage the dog had learned that the bell was the signal for the supply of food and therefore he salivated to the signals even when the food was not followed the signals. This was the stage at which the dog had been conditioned to respond to a new stimulus — the bell sound which did not cause salivation in the first stage. The essence of this experiment is that a meaningless stimulus (the bell sound) could evoke an internal response in an organism. After this study, physiologists and psychologists started studying the conditioned response of several types on animals and men. Some of the other responses studied were protective reflexes, orienting reflexes, eye-blink and so on.

THE CONDITIONING PROCESS

In Pavlov's experiment on conditioning we could observe four separate elements present. The reflex or the saliva is a response to the food. The food is the first element. Pavlov named this as the unconditioned stimulus (UCS). The salivary response to food is the second element which is called the unconditioned response (UCR) because it occurred before the process of conditioning took place. When the unconditioned stimulus (UCS), the food, was combined with a conditioned stimulus (CS), the bell sound (which did not evoke salivation in the beginning), and repeatedly presented for several times, the conditioned stimulus (the bell sound) began to gain control over the unconditioned response — the salivation. The conditioned stimulus (CS), the bell sound, was able to elicit the response (salivation) even when the unconditioned stimulus (UCS) — the food was not presented. When this process occurred the neutral (artificial) stimulus, the bell sound had become a conditioned stimulus (CS). This is the third element.

A conditioned stimulus may be defined as an event like the bell sound, a light, a pressure, or a shock — that is a neutral stimulus and does not elicit any desired response originally. For example, ordinarily the bell sound would not elicit any saliva in a dog's mouth. But when the dog is conditioned in this way he salivates on hearing the bell sound. This kind of response is called conditioned response (CR). This is the fourth element in Pavlov's conditioning process. These four elements can be presented like this:

Before conditioning	During conditioning	After conditioning
CS —> No response (Bell) UCS —> UCR (Food) Salivation	CS (Bell) and UCS (Food) —> UCR Salivation	CS —> CR (Bell) Salivation

Any response which is produced automatically by a specific stimulus can be conditioned. In other words, any unconditioned response to an unconditioned stimulus can be conditioned. Conditioning depends upon closely pairing of the conditioned stimulus (Bell sound) and the unconditioned stimulus (food). If these two were presented in an unrelated and haphazard manner conditioning will not take place.

CLASSICAL CONDITIONING IN HUMAN BEING

Human beings begin to learn from the time when they were born. Babies and small children learn to blink their eyes when they hear a sound. Adults also learn by classical conditioning. The eye-lid conditioning experiments have been conducted successfully with dogs, monkeys, and college students by Anrep. The results show that conditioning process is the same in all these three kinds of subjects. Another author, Lipsitt had observed that small babies only 5 to 10 days old learn to blink their eyes on hearing a tone. The air puff apparatus had been used by him. A puff of air was blown into the babies eyes and babies naturally blink. The puff of air is an unconditioned stimulus and the babies blinking is the unconditioned response. It is a natural reaction.

The air puff was paired with a tone and it was sounded immediately before the air puff was blown. When this was repeated for several times the babies soon began to blink their eyes when they hear the tone. Lipsitt observed that the babies learned to associate the tone with the air puff and began to blink to the tone even when the air puff was not blown. In this way the babies produced a conditioned response to a conditioned stimulus (the tone). In our every day life we learn many things in this way and we are responding in certain situations even when there is no real stimulus that can arouse the desired response.

EXTINCTION AND SPONTANEOUS RECOVERY

We must know that classical conditioning is not producing a permanent change in the behaviour of the

organism. What happens to conditioned response when the conditioned stimulus is presented alone for several times ? The conditioned response (salivation) becomes weakened and gradually the response is eliminated. In the case of Pavlov's dog, he stops salivation when the bell alone is presented repeatedly. This process of elimination of salivation is known as extinction. When the conditioned stimulus appears alone several times the learned organism fails to associate it with unconditioned stimulus and stops the salivary response and extinction takes place.

But, what happens when once the response has been eliminated ? Has it gone for ever ? Pavlov tried to study this in his dog. He allowed the learning in the dog to extinguish. After a few days the same dog was brought again into the laboratory and the same procedure was repeated. As soon as the dog heard the bell sound his mouth began to salivate. The response that had been learned once and extinguished reappeared without any retraining. Pavlov called this phenomenon as spontaneous recovery. Though the response was not as strong as before the extinction the spontaneous recovery indicated that learning was not lost permanently during extinction.

Has the animal really extinguished all his original learning ? If such thing had taken place the spontaneous recovery would not occur. But, what actually happening was that the animal had developed an inhibition. This process of inhibition suppressed response that had been learned by the animal earlier. At this stage the animal is in between a pull by learning in one direction and a pull by inhibition in another direction. If the learning pull is stronger than the inhibition pull then a response will be continued. If the strength of inhibition is equal to that of the learning the animal will not produce conditioned response and extinction takes place. But as time goes on the inhibition becomes weaker and weaker and spontaneous recovery will take place.

The inhibition is the process in classical conditioning that temporarily blocks the response that has been learned. A sudden change in the learning situation may also block a conditioned response. Once, in Pavlov's laboratory while some experiment was going on, Pavlov suddenly appeared on the scene. This event had disrupted the dog's routine performance. Then, he called this process as an external inhibition. That is, a strange person's appearance in the room caused the inhibition. But, the lost response can be rebuilt again by presenting the unconditioned stimulus (the food) along with the conditioned stimulus (the bell sound). This phenomenon is called reinforcement. It is a process of strengthening the conditioned response.

OTHER PROPERTIES OF THE CONDITIONED RESPONSE

(a) Generalization: Certain objects or events may resemble some other objects or events. The resemblance may be so close that the learner or the organism may react to one in the same manner as he reacted to another. In the case of conditioned response, a response which had been conditioned to a particular stimulus can also be aroused by another stimulus which had certain similarity. This spreading of conditioned response is called stimulus generalization. Pavlov's dog, which had been conditioned to salivate to the bell sound also salivated to the sound of a buzzer and to the sound of a metronome. The dog's conditioned response had been generalized to other sounds also. The man who got into some motor car accident and injured would develop a conditioned fear response to any transport like, train, bus, plane, lorry and so on. This kind of generalization is natural to all organisms.

(b) Discrimination: In the learning process, if we wish to narrow down the range of effectiveness of the stimulus more effort must be put. It is a way of preventing the organism from generalization and making it

to react to a specific stimulus. This process, we call discrimination training. The organism learns to differentiate one among many stimuli and respond to it. Generally, discrimination training is a very important process in our every day life. If this is not taking place accurately lots of confusions would occur in the world. You are able to discriminate the college bell from the railway bell, the temple bell, or the church bell, the fire alarm bell and several other bells without any confusion or mistake. Discrimination is mediated by past learning.

(c) Higher-order Conditioning: This is another important aspect of classical conditioning. A conditioned response is built on the basis of a previously established conditioned response without any unconditioned stimulus. For example, the dog had learned to salivate on hearing the bell sound. But, Pavlov wanted to teach his dog to salivate on seeing a black square. Pavlov had shown the black square to the dog along with the supply of food. Next time he had shown the black square to the dog following the bell sound and not following the supply of food. The dog had learned to salivate when he saw the black square. Here, the black square was used as a conditioned stimulus, and the bell was used as an unconditioned stimulus. This kind of learning is based on the previous learning. Pavlov called this process as the higher-order conditioning.

OPERANT CONDITIONING

Classical conditioning involves learning to respond to something that does not ordinarily cause such a response. A natural response is caused by an artificial stimulus. The dog learns to salivate to the sound of a bell. It is passive and simple. The behaviour is elicited by some external events. There is another kind of conditioning called operant conditioning or instrumental conditioning. In classical conditioning events are anticipated in the environment. But, in operant conditioning events are caused or the organism changes its environment.

Most of our behaviour is emitted and voluntary. The behaviour is not triggered by outside events. For example, a child draws her mother's attention for care by crying. A school boy raises his hand in the class room as a gesture of informing the teacher that he knows the answer to the question posed by the teacher. A dog wags his tail and jumps in front of his master and gets patting or a piece of biscuit. A University student works hard systematically to get a pass with the first class. A passenger in the railway compartment pulls the chain and stops the train when he sees some robbers in his compartment. Actions of these types are called operant behaviour. These actions are designed to operate the situation or instrument in some way to gain something desired or pleasant or to avoid something unpleasant. Operant behaviour is learned behaviour pattern. It takes place through operant conditioning. Operant conditioning is another type or kind of learning.

Operant conditioning may be defined as a type of learning in which the desired voluntary (behaviour) response is rewarded and incorrect response is ignored or punished. According to Kendler an operant conditioning is an instrumental conditioning situation in which the organism is free to respond at any time. This type of learning occurs in animals and in human beings. Operant conditioning is a recent addition in the psychological studies. But animal breeders have been using operant conditioning for hundreds of years. Dog and cat breeders, monkey, horse, elephant and other animal trainers often speak of new tricks in animal behaviour. In circus companies there are expert animal trainers.

A wild animal like lion or tiger learns to sit on a stool in a circus on the appearance of the ring master into the ring with a whip and an iron-rod. All of you might have seen and enjoyed the dance performances of the animals like the bears, elephants, horses, monkeys in circus companies. Whenever the circus horse performs a desired response and pleases the audience the horse

master puts a piece of sugar candy into the horse's mouth secretly as a reward. Horse is very fond of sugar candy. Similarly the dog trainers often reward the dogs when they perform the desired tasks. Whenever the horse fails to perform the desired task the master whips the horse with a loud noise. These are the procedures involved in operant conditioning. In operant conditioning, whether it is animal or human learning correct responses are reinforced by rewards and incorrect responses are ignored and punished. A correct response is reinforced and repeated and therefore it is learned.

In psychological laboratories several different kinds of instruments are used in operant conditioning experiments. The most widely used apparatus is the skinner box. B. F. Skinner, the famous American psychologist had designed the box and it is called after his name. He had developed several techniques of operant conditioning. The boxes were of different sizes and shapes according to the size of the animal. The rat was the animal mostly used in his experiments. When Skinner started his conditioning experiments in 1932 his experimental animal, the rat was allowed to be familiar with the box and it was not frightened in the new situation. Then the rat was made to starve by 24 hours without food and then it was put into the box. It was a small box with bare walls and a protruding bar and a cup. There was a opening below the bar from which pellets of food can be drawn. The hungry animal began to explore the whole box. It wandered all around sniffing and standing on its hind legs and expressed several casual behaviours. After some time it put its weight on the bar by chance and pressed it. Immediately pellets of food were dropped into the cup by a mechanical device. The hungry rat ate the food and continued its exploratory activity. In its exploratory behaviour the rat happened to press the bar (lever) two or three times and food appeared all the times. The animal, then learned that it could get its food by pressing the bar every time. The supply of food by pressing the bar made the rat to repeat the bar pressing

activity whenever it wanted food. In this way the food getting response was strengthened by pressing the bar repeatedly. This process, in operant conditioning is called reinforcement and it is the primary concept.

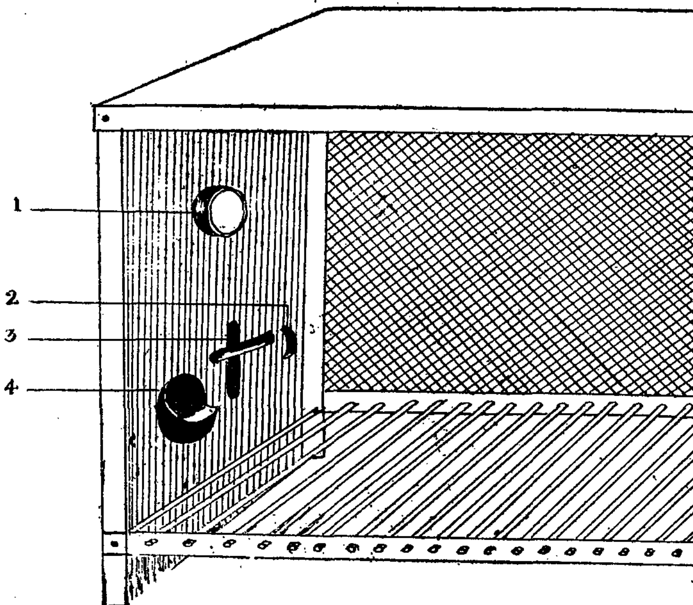


Fig. 1.2 A Skinner Box
1. Light 2. Water 3. Lever Bar 4. Food Cup

Psychologists have devised a formula to represent the operant conditioning. It is —

$S_1 -> R -> S_2$

Here S_1 represents the Skinner box,
R the bar pressing response and
S_2 the food produced by the R.

1. **Acquisition of Response**

In classical conditioning the response is elicited and it is easy to produce the desired response. What Pavlov did to make his dog to salivate was to put meat powder

in the dog's mouth. Operant behaviour cannot be elicited in this way. A hungry rat will not press the bar naturally. On pressing the bar if the rat did not get its food there will be no learning in the rat. Therefore, what is important in operant conditioning is, making the desired response to occur and then it can be reinforced and learned. All of us use several different methods in our every day life to evoke the desired response. It is a matter of common sense and sometimes we do it without any kind of thinking. Skinner includes Thorndike's trial and error method of learning in his operant conditioning. We are dealing with trial and error method of learning separately.

(a) Motivation and Learning : Motivation is a dynamic process. By increasing motivation it is possible to speed up the process and increase the correct responses in an organism. A hungry rat will move around the Skinner box more swiftly than one that has been fed. This will make the rat to discover the bar in the Skinner box and press it and release the food pellets. The influence of motivation on learning appears to be simple. But it is one of the most complex problems in psychology. It is generally believed that increasing motivation will always speed up learning. It is not correct. In certain situations learning is retarded by increasing motivation. Scientists are forced to give the idea that motivation can be taken as a simple casual agent in behaviour. Motivation has several facets and each demands different answer.

(b) Guiding Behaviour : In recent years attention has been paid to different kinds of experimental methods. One of the important and widely used methods is operant conditioning. The activity of the animal in the situation is more important in this.

Another way of getting the desired response in an organism is forcing or guiding behaviour. The experimenter himself actively participates in the situation and

guides the organism or the learner through correct responses or movements. This procedure can be followed in animal learning and in human learning. If you want to teach your dog with new ways of behaviour the best method is to guide him through right movements. While making the child to learn to write the alphabets and to write his name, one way of teaching him is to direct his hand to go through the correct lines, so that he will do the same thing next time.

2. **Reinforcement**

We have been describing the various ways of producing the desired response in an organism. In operant conditioning it is also important that the desired response should be repeated correctly. In training the animal we saw that the animal is rewarded for every correct response. The reward strengthens the desired responses, and also increases the chance of repeating the same. Psychologists called this reward as reinforcement. Reinforcement is defined as an event like presentation of food that increases the tendency in an organism for a stimulus to evoke a response.

Reinforcement may be also defined as a process of strengthening a correct response produced by an organism and building up a tendency in it to repeat the same response often. Reinforcement is the primary concept in operant conditioning. Any response followed by a reinforcement is likely to be repeated and therefore it is learned. We have used this concept in Pavlov's classical conditioning. But, here we are using it with different meaning. In classical conditioning the concept is referred to unconditioned stimulus — the meat powder. It strengthened the conditioned response. The meat powder is not given as a reward.

(a) Primary and Secondary Reinforcement: Reinforcements are classified as primary and secondary reinforcements. A primary reinforcer is one whose reinforcement value is innate or unlearned. It is

rewarding in itself. The primary reinforcers are food, water, sex and removal of pain. A secondary reinforcer is one whose value is learned and associated with the primary reinforcer of the past. It is secondary because it is learned. For example, a rat learns to press the bar and gets its food. One experiment conducted by Bugalski in 1938 is worth mentioning here to illustrate secondary reinforcer. The Skinner box was used in this experiment. In the first stage, the bar pressing was always associated with a click sound by the food dropping device. In the second stage, the subjects were divided into two groups. In the case of one group, the bar pressing response produced a click sound and also delivered food. In the case of the other group, the bar pressing response did not produce the click sound and no food was delivered. Here the phenomenon studied was that which of the two groups would extinguish more rapidly.

For the first group the click was closely and consistently associated with the primary reinforcer — the food. Therefore, it should acquire reinforcing properties. During the period of extinction food was no longer received on pressing the bar. But the first group would be receiving the click sound — the secondary reinforcer whereas the second group received neither the click sound nor the food. In the case of the first group the click sound worked against the effect of extinction. In other words, even though food was not delivered on pressing the bar the animal pressed the bar because there was some response — the click sound. The click sound strengthened the animal's tendency to press the bar though ultimately the tendency was weakened by the absence of the primary response — the food. In the case of the second group, the bar pressing response was extinguished more rapidly during extinction because of the absence of the secondary reinforcer — the click sound. Money is used for different kinds of secondary reinforcers. Money itself is not food, but we can get all the primary reinforces like food, water, clothing, sex

etc., through money. Therefore, it becomes a powerful secondary reinforcer.

(b) Positive and Negative Reinforcements: Reinforcements are also classified as positive reinforcements and negative reinforcements. If the response action is pleasant or good to the learner it is called positive reinforcement. For example, food and money are positive reinforcements. Negative reinforcements involve the termination of painful responses such as shocks, uncomforts and so on. Both types of reinforcements bring about learning when they follow a response. A child might learn to solve his arithmetic problems for which he receives praises. The praise here becomes the positive reinforcement. By this means he also avoids getting scolding from his teacher if he fails to solve his problems. In this way it becomes the negative reinforcement, the child could avoid unpleasant experiences.

(c) Punishment: Punishment may be physical or verbal from parents, teachers, or leaders or from society if you violate the codes of behaviour. Reinforcement is used to strengthen a response. If an organism is punished for producing a response it will less likely repeat the same response. A man is put in the prison for stealing another man's property as a punishment and we hope that he will not repeat the same action. But punishment often does not work successfully. Children often continue committing certain activities for which they have received punishment. Criminals repeat the crimes after coming out of prisons. In all these cases punishment had no effect. Therefore, the effectiveness of punishment mainly depends upon when and how it is used. An undesirable behaviour should be immediately followed by a punishment. Courts take years to convict and imprison a criminal. Here punishment loses its effect, because punishment comes too late. The person himself might have forgot for which crime he receives this punishment.

Further, punishment should be adequate so as to correct the child from committing the same mistake once

again. Strong punishment alone can reduce the response effectively and permanently. Punishment should also make the organism to be aware of the response (the mistake or crime). The mother tells her child not to touch the costly vase again. The words had no effect. She slaps him. The harder she slaps him quicker the effect it will have on him and he will learn not to touch it. Punishment will have effect if only it is continued. If it is not consistently applied the undesirable behaviour may reappear. There should not be any reward following the punishment. Parents often slap children and immediately hug them. Parents should avoid this kind of attitude. This would cause confusion to the child that reward follows punishment. Such kind of punishment and reward at the same time would create inconsistency in the child's behaviour. Punishment is actually a kind of reinforcement which strengthens the child's non-response to undesired behaviour. Punishment can suppress a response so that other responses can be reinforced. It would make the child to be more aware of undesirable behaviour and instill a fear of certain situations. Therefore, punishment is an important training tool if it is properly used.

(d) Partial Reinforcement: Once a response is conditioned it can be maintained by a few reinforcements. A rat has been trained to press the bar for food and food need not be dropped for every response. But food may be dropped for every alternative response, every fifth response, every tenth, every twentieth until the bar pressing response is maintained with one reinforcement for every hundredth responses. That is, the process is continued until the rat presses the bar for one hundred times for getting food once. This is called partial reinforcement. Rewards are not given for every correct response, but for some responses. Skinner had conducted such experiments on pigeons and rats. The programme for choosing the responses for reinforcement is called the schedule of reinforcement. The reinforcement schedules are fixed intervals and variable intervals. These are based upon

time. The other schedules are fixed ratios and variable ratios. These are based upon the number of correct responses.

Skinner observed that pigeons and rats are also higher organisms adapted to different reinforcement schedules and behaved differently on the basis of time (interval) (i.e., a response is reinforced once in 5 minutes) or on the basis of the number of responses (i.e., every twentieth response is reinforced).

3. **Discrimination**

This is the ability to discriminate between similar stimuli. Discrimination also refers to the ability of determining whether the right (rewarding) stimulus is present in the situation. It is important in operant conditioning that the learner should know when he should do the

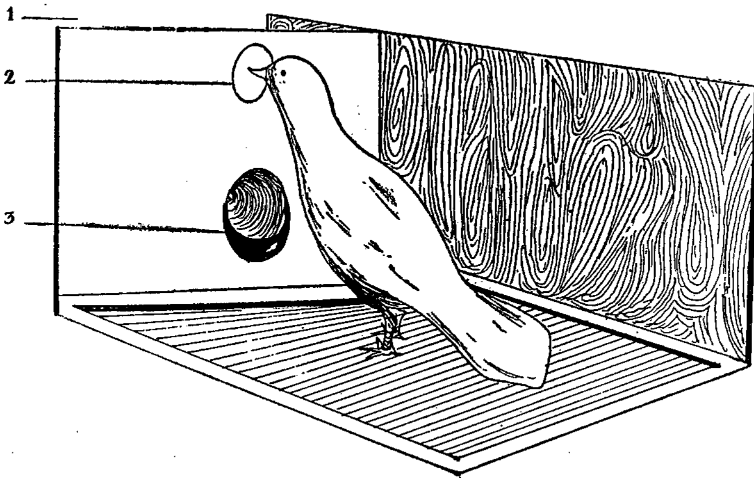


Fig. 1.3 An Operant Conditioning Situation

1. Mechanism Compartment 2. Disk 3. Food Delivery

appropriate response. Discrimination training is given to the organism by rewarding one response and not rewarding the other. The discriminative stimulus is constantly

associated with the reinforcement which develops incentive and reinforces the properties of its own. The discriminative stimulus becomes an incentive and activates the organism. Pigeons were trained to peck at a disk. Then they were presented with two disks, one red and one green. The pigeon received food when pecked the red disk but not when pecked the green. Finally, the pigeon had learned to discriminate between the two disks and pecked only the red disk. The baby also learns to discriminate between his mother and other ladies, his father from other men after committing certain errors in the beginning.

4. **Extinction and Spontaneous Recovery**

The operant conditioned responses extinguish in the same manner as the effects of classical conditioning. A response which is not reinforced tends to lose its strength in extinction. Extinction is a graded process—the process by which a response is extinguished. This depends upon the degree to which the response had been reinforced previously. But a response that had been extinguished can be recovered spontaneously. Spontaneous recovery is the reappearance of the original learning after it had been extinguished. A learned effect that is extinguished long back can be brought back by a single reinforcement.

5. **Shaping**

Operant conditioning is used to teach some very complex behaviour patterns. The parts of the sequence have to be learned separately. In learning complex patterns we must integrate the bits of behaviour step by step into a complex response. The procedures of teaching complex behaviour pattern is to reinforce the partial responses. The bits of responses are made up into the whole. The complete response is shaped bit by bit. The method used to the behaviour of this fashion is called the method of successive approximation. In this process of shaping, every bit of response that leads to the whole is rewarded.

6. **Behaviour Chains**

Operant behaviour is a combination of several events. It is a chain and not separate events. One event functions as a cue to next event which in turn activates the next one and so on. In this way a chain is formed. Most of the operant behaviour functions by connecting together the response, the stimulus, the response and so on in sequence. The chain ends with the reinforcement. Most of the complex motor behaviour is considered as the result of a process of chaining. When a discriminative stimulus is established it would help to reinforce other responses. In an experiment conducted by Skinner it was observed that the rat had learned only to press the bar when the light was on. The rat was trained to produce other responses also like pulling a string when the buzzer sounds. When the rat was placed in a dark cage it pulled the string to turn on the light and when the cage was illuminated with the light it pressed the bar to get its food. The string-pulling and bar pressing form a chain behaviour. This behaviour has been built up through reinforcement, discrimination and secondary reinforcement. Most of the human behaviour occurs continually in a chain like manner. For example, in teaching the child to learn the language, he is taught first letters or short words, then short sentences and so on.

TRIAL AND ERROR

Trial and error is one of the most common methods of eliciting the desired response. It is waiting for the subject's correct response. The child cries in a particular fashion. It is by an accident. But if he finds that his mother runs towards him and takes care of him, he learns to produce and repeat the same type of sound to draw his mother's attention. Whenever he wants her care he produces the same sound. Thus he has learned to produce the desired response in his mother.

Similarly we can observe trial and error learning in rat's behaviour. The Skinner box may be used for this

purpose. The box is constructed in such a way that the bar can be removed and inserted. This device would make the rat's behaviour to change in successive trials. A trial may be defined as the unit of practice in learning experiments during which an organism is exposed to a specific stimulus situation. A trial may also be defined as the amount of time the rat takes for a correct response in a learning experiment.

In a series of successive trials in Skinner box the sequence of behaviour involves pressing the bar and eating the food and repeating the same. It is observed that certain important changes are taking place in this process. In the beginning the rat takes more amount of time to find out the bar and to press it. In successive trials the amount of time for the task is gradually decreasing. Similarly the amount of time taken by the rat to eat the food is longer in the beginning, but the same is gradually decreased in successive trials. This shows that there is certain improvement in the behaviour of the rat. This is what the experimenters expect from the experimental animals. The animal gradually discards the wrong and unsuccessful movements and retains correct and successful movements.

But, the kind of improvement we see in the experimental animal is not always steady in every rat. On some trials the rat's response is slower than the previous trials. When large number of rats is used in such experiments the mean time of their responses decreases consistently on successive trials.

Trial and error learning involves the idea that an organism, as it progresses through its activity, continually meets with certain problems. The solutions to the problems require the combined application of generalization from the organism's past experience and the discovery of appropriate responses to the problem situation. Trial-and-error learning is also stated as trial-and-success learning. Trial and error learning is originally set forth

by E. L. Thorndike. According to him the trial and error learning process is governed by three laws. They are, the law of effect, the law of frequency and the law of recency.

The law of effect refers to the activity that is successful and provides satisfaction to the organism. This activity is fixed and retained. The unsuccessful movements are discarded.

The law of frequency refers to the repetition of the activity for certain number of times. It is a tendency to establish an activity permanently. The repetition also increases the amount of strength of the activity.

The law of recency refers to the repetition of a recent and new activity. It is repeated for familiarity.

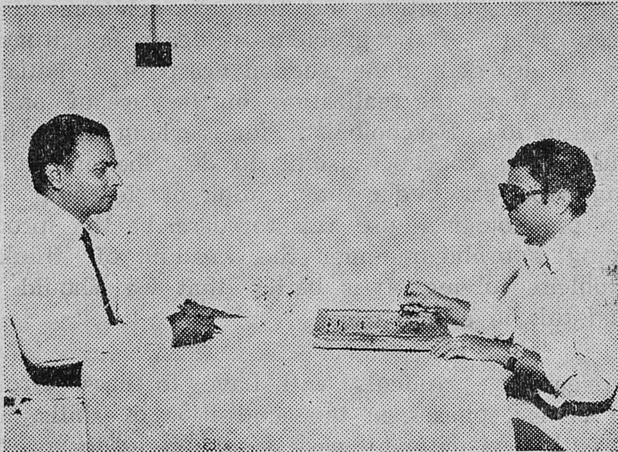


Fig. 1.4 Learning Slot Maze

Thorndike used mostly cats as his experimental animals. He designed puzzle boxes with sides made of bars and doors. The door could be opened from inside by lifting a latch. Thorndike put a hungry cat inside the box and placed food outside and observed how

quickly the cat learns to lift the latch and go out to eat the food. The number of trials for successful performance and the amount of time taken by the cat for each trial were taken into account. After conducting several experiments Thorndike concluded that animals learn purely by trial and error method and this learning takes place according to the three laws explained above.

INSIGHTFUL LEARNING

Insightful Learning is a concept used by the Gestalt psychologists to describe the process of learning. Gestalt psychologists are of the view that insight is present in all animal learning. Though insight is gradually dawning in learning situation its most characteristic form is its sudden appearance or flash. Insight means understanding. It is a way of finding out solution to a problem suddenly. Insight is comprehending the organisation and the inter-relations of the significant parts of the problem in learning situation. It may be also defined as sudden grasp of a situation or problem. It is the realization of the use of an object or situation. Psychologists for a long time have been using this concept 'insight' to describe one of the learning processes under the heading of 'learning'. But modern psychologists use this to describe the process of solving a problem under the heading of 'thinking and problem solving'. It is better that we should understand this in either way.

In learning, students will have to pass through certain critical phases in the acquisition of skills. This involves the capacity to pass from pieces to an integrated form. Children pass from a letter habit to a word habit and to phrase habit. The important process involved here is the combination of different elements into a meaningful composite whole. When an individual for the first time meets with different kinds of unrelated stimuli, he tries to relate them into a single whole pattern. He is in a state of helplessness. Then, suddenly he

learns to have a control over the situation and gets mastery of the problem. This process we call insight. It is something going below the surface level of things. Monkeys, particularly, chimpanzees are capable of insight learning. Kohler's experiment on chimpanzees is a classical illustration to demonstrate insight learning in chimpanzees. They are capable of relating objects to the situation. Chimpanzees also, like all other animals learn to some extent by fumbling and success.

In a number of experiments with apes Kohler had observed good evidence of insight in the animals. The animal was kept in a cage with banana lying outside beyond the reach of its hand. A stick was lying within the reach of the monkey's hand. The monkey was able to make use of the stick and pull the banana inside the cage. Then the animal was given a two stick problem. A short stick that is available at close range will not reach the banana. Only a longer stick could help the monkey to pull the banana inside the cage. The animal learns the trick that no single short stick can be useful for his purpose. Two short sticks were placed close to the animal. Neither of them was long enough to reach the banana. One stick was smaller in diameter, so that it can be fitted into the open end of the other stick.

After struggling for an hour with short sticks unsuccessfully the animal had learned that the sticks were too short for his purpose. He gave up the attempts and went behind the cage. While playing with the two short sticks end to end he pushed the one end of the smaller one into the open end of the longer one. On seeing the longer stick the animal jumped with joy and ran to the front side of the cage and tried to pull the banana with the joined stick. At one stage the joined pieces were separated as the joining was loose. He was able to put them properly once again. He, then pulled the banana and ate it. The same experiment was repeated on him the next day. The animal was able to join the sticks within few seconds and used it in the same manner. The

capacity to put the matters into new relationships which were never previously experienced is called insight. Kohler explains insight in terms of brain physiology. According to him animals learn by insight. This idea is contrary to Thorndike's idea that animals learn by trial and error method.

There appears to be something in common between insight and intelligence. As far as learning is concerned both insightful learning and intelligence are involved to some extent. But the term 'insight' has a wider meaning since it is applied to all types of learning. The capacity to learn difficult problems depends upon the development of the complexity of the nervous system in the organism. Most of the lower animals mainly behave instinctively and mechanically and therefore learn by trial and error method. Certain higher animals like apes or chimpanzees learn by insight whose level of mental ability had been compared to that of three year old children. The level of insightful learning seems to be increasing in organisms in relation to intelligence which is based upon the development of the complexity of the nervous system. This is the reason man with his highly developed complex nervous system is able to exhibit higher order of insightful learning and intelligence.

ANIMAL LEARNING

In the preceding sections we have seen that most of the experimental works on learning were done with animals. Animals were used as subjects in physiological and psychological laboratories. Psychologists are very much interested in animal learning, because it is easy for them to conduct experiments on animals rather than on human beings. Further, they wanted to know whether animals are capable of learning. If they are satisfied with their experiments on animals, they hope, they can carry on the same type of experiments on human learning also.

This is how lots of experiments on animal learning are available for us.

Animals learn by all the four methods we have described above like classical conditioning, operant conditioning, trial and error and insightful learning. Psychologists are of the view that the fundamental processes of learning can be seen more clearly in simple type of learning as animals do and not in complicated processes of learning as human beings do. After studying the simple type of learning processes it is easy to study the complicated processes of learning. Therefore, investigators on the nature of learning always begin with the simple learning processes of animals. Those who studied the learning processes of animals fall under two groups emphasising two different thoughts. The first group emphasises that animals learn by habit. It is the result of the process of trial and error and not insight. E. L. Thorndike (1874 - 1949) and C. L. Hull (1884 - 1952) were the exponents of this idea. The other group stresses that animals learn by insight. The level of learning may be low, but still it is insightful learning. They say that it also takes place in classical conditioning and operant conditioning. The animal in the beginning tries the problem only in fumbling manner with wrong movements. W. Kohler and E. C. Tolman were the forerunners of this idea.

Whether it is animal learning or human learning the power to learn and reproduce is one of the most important facts in learning. This is present both in animal learning and human learning. If knowledge is of fundamental in nature it will be more useful in the life situation. Man solves his problems in the same manner as animals do. For example, in the Skinner's experiments the rat learns to run the maze. Just like the rat in trial and error method of learning eliminates wrong movements and retains right movements man also solves his problems. Lloyd Morgan, one of the founders of animal psychology had laid down the principle of Canon of

parsimony. According to his principle no action can be claimed as the outcome of higher mental faculty.

Lloyd Morgan's dog learned to open the gate by pushing the latch by his nose. The dog's behaviour was not based on any reason in fiinding out a solution. It was only by trial and error. But the dog had learned exactly the place where to work, though there were certain errors. This, we call place learning.

E. L. Thorndike, another pioneer in the field of animal learning, used mainly cats as his experimental animals. Thorndike's hungry cats learned to lift the latch in the puzzle boxes and learned to get out and eat the food. In this way the experimental rats and cats had learned the places and things. These animals make responses to sensory stimuli. They make muscular movements or manipulate certain objects. This is called tool learning.

In psychological experiments the favourite animals that are used for place learning are the rats and for tool learning the cats and monkeys or chimpanzees. In animal learning we get more information from monkeys. The monkeys have better observation of objects and manipulate the tools much better than the rats and cats. The monkeys have much developed nervous system and larger brains. They learn much quickly and handle the tools successfully quite similar to human beings using insight. Kohler's experiments with monkeys and chimpanzees were classical illustrations to demonstrate this process of learning.

Apart from place learning and tool learning an organism has to anticipate certain happenings in the environment and he must be ready to acquaint himself with them. It is applicable to both animals and men. An organism is capable of learning the sequence of events. He keeps himself ready to what is going to happen in the environment. There are several regular sequences

occurring in the life of an organism and they become automatic in its behaviour. This kind of preparatory response becomes an involuntary part of its action. This principle was demonstrated by Pavlov in his dog's behaviour by making him to salivate to an artificial stimulus — the bell sound. Pavlov called this process as conditioned response or learning of sequences. The dog had learned to salivate (natural response) to a neutral stimulus (the bell sound). From these discussions we understand that a rich source of information had been derived from animal learning. The information collected from the experiments with Thorndike's cats, Lloyd Morgons's canon, Skinner's rats, Kohler's monkeys and Pavlov's dogs are also applicable to men as the same processes found also in human learning.

HUMAN LEARNING

Animals and birds have certain limited and simple needs of life. These needs are fulfilled by their instinctive behaviour pattern. The instinctive and sensory behaviour pattern of certain animals and birds is far superior to that of man. But man's intelligence and his unlimited capacity for learning can help him to conquer animals in all respects. He has to learn everything in this world. Man's capacity to form concepts and symbols and to develop language for communication is highly distinctive from animal learning.

Human beings learn in a number of ways. Learning occurs in man immediately after his birth and some learning occurs even before his birth. This learning in man is a continuous process and it goes on throughout his life. Experiments on human learning are so numerous that it would be impossible to enumerate all of them. Human learning is classified into several types. The four types we have described above are found in both animal learning and human learning. Some are of the view that these are associative process of learning. They can ex-

plain only simple form of learning. Perception and understanding play important role in complex form of learning. Human learning is of complex type. Motor learning and verbal learning are the most significant kinds of learning for human beings. Pavlov's conditioning experiments are possible with human beings. It is possible to condition a number of responses in man such as knee jerk, winking reflex and so on. Some of them have been explained already. Here we will deal with the important human learning.

Multiple Response Learning: It is a kind of learning which involves more than one identifiable act, having the events fixed in an order as demanded by the situation. The multiple response learning is sometimes called as motor and verbal learning. Laboratory instruments have been designed by psychologists to study this kind of learning. The mirror drawing apparatus, pursuit rotor, reaction time apparatus, memory drum are some of them designed to study motor learning.

The mirror drawing task is a form of sensorimotor skill. In sensorimotor skill muscular movement is important. This activity is taking place under sensory contact. For example, driving a motor car, riding a bicycle, playing a piano, typing a letter all are motor activities involving sensory control. While driving a car or riding a bicycle we are watching on all directions in the cross roads whether any one crosses the road and also we watch carefully whether there are any bumps on the road or red light on the traffic post. We are guided by all these factors. Further, the driver of a motor car must maintain the speed and time, the piano player must read the notes, the typist should copy the manuscript according to the specifications. In all these we could see more than one activity is involved in the task apart from muscular movements.

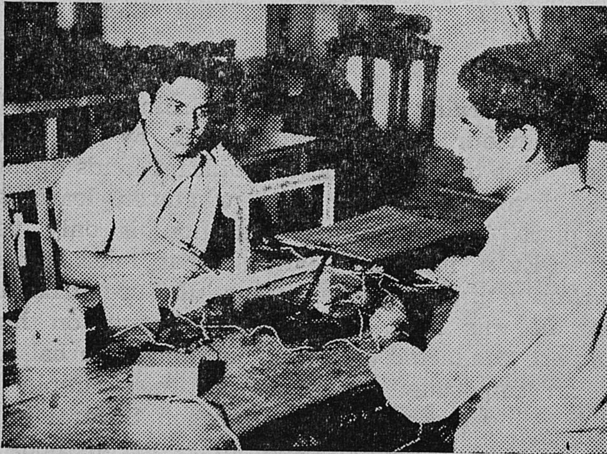


Fig. 1.5 Learning : Transfer of Training - Mirror Drawing Apparatus

A good laboratory experiment to illustrate the sensorimotor skill is the mirror tracing. The subject is required to perform some activity requiring eye-hand co-ordination and his performance is measured. What occurs when the eye-hand co-ordination is accurate and not accurate ? The subject has to adjust his task accordingly.

In the mirror drawing experiment the subject has to trace the star pattern which is fixed on a wooden frame by seeing the pattern in the mirror which is fixed vertically at the end of the wooden frame. The star pattern which is perceived by the subject is reversed by the mirror. The subject has to run a stylus through the path without touching the sides and complete it. Every time the stylus goes away from the path it touches the sides and an error is committed. The amount of time to complete the tracing task of the pattern and the number of errors are taken into account. The task is very difficult. This experiment is suitable for studying the transfer of training. How many trials the subject takes to perform the task without any error and how

much time he takes. This is the theme of this experiment.

Verbal Learning: In verbal learning the subjects' verbal behaviour is measured. It is by the use of language. It is one of the most significant kinds of human learning involving words. But whatever learning is taking place in the formal education is only verbal learning. Even informal learning that takes place in adults is only through verbal means—the use of language. Because of this most of the experiments on human learning are conducted on verbal learning. Verbal learning is an important connection between simple non-verbal learning processes and language. Several experiments have been devised and different methods and materials have been used. The materials for the study of verbal learning range from highly meaningful stories to meaningless non-sense syllables.

Verbal behaviour gives accurate description of an individual's experiences. Verbal behaviour is not accessible to operant training. We have learned to respond to the verbal behaviour of others. All our thought processes are based on language. The effect of instruction is an important variable in verbal behaviour. The instruction must help a person to produce the desired response. The instruction may be a simple word when parents speak to small children. The same may be complicated with college students when the teachers speak. But wherever verbal instructions are given they must be clear and appropriate to arouse the desired response.

TRANSFER OF TRAINING

Transfer of training is one of the most important psychological problems of learning. The idea behind this concept is that whatever you learn must be useful to you later on. Transfer of training may be defined as the application of the training received previously in one situation to other forms in another situation. The new

learning may be applied sometimes more rapidly and sometimes slowly in another situation. Transfer of training received greater importance in the field of education. Educationalists in the early days believed that the study of mathematics led to the development of acquiring mastery over Greek and Latin, because Greek and Latin produced attractive syntax and good English vocabulary. They thought that it produces positive transfer in education. But researches conducted in the first quarter of this century have proved that this belief is wrong.

All learning, it is believed, is transferable to new situations. But the amount of transfer often may vary from person to person and situation to situation. Transfer of training may be positive or negative. Positive transfer occurs when the organism's performance is benefitted by the previous learning in a new situation. Negative transfer occurs when an organism's performance in new situation is hindered by previous learning. Generally, the term 'transfer' refers to the effect of previous learning upon following similar performances.

The important rule of transfer of training is the degree of similarity of stimuli and responses. The phenomenon of stimulus generalization may be applied in transfer of training. Therefore, if the similarity is greater the generalization also is greater.

Another important rule of transfer of training is the occurrance of negative transfer when the desired response is different from that of one learned previously in that situation. The more dissimilar the new response is to the previous response the greater the negative transfer occurs.

In human behaviour the transfer of skill is important. The problem of transfer is not only changing simple responses or skills but also it is something more than this. What kind of skills can be transferred best

to a new job in an industry ? If an employee possesses a particular skill which is not needed to his new job, will this skill be transferred positively or negatively in a training programme ? This kind of problems depend upon the attitudes and expectations of the learner. The emotional reactions conditioned in one situation form the foundation of prejudice in another situation. Racial prejudices some times find their sources in the hatred developed by a person against a member of his own group. The psychological process of scape-goat functions in the same manner. Political leaders often make use of rage or fear responses conditioned previously to activate people against the people in power.

We can design an experiment to study the transfer of training. Some kind of training is given to an experimental group and the performance of this group is compared with a control group which did not receive any training or experience. If the performance of the experimental group is superior in similar task in comparison with the control group it is evident that the experimental group had the benefit of the training. There is positive transfer of training. But if the performance of the experimental group is inferior to that of the control group there is negative transfer. We cannot bring all cases of transfer of training under either stimulus similarity or response similarity. They both interact sometimes to produce transfer.

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Chapter 2

MEMORY

What is the name of the author who wrote the book 'The Vicar of Wake field' ? What are the cardinal teachings of Goudama Buddha? Where did you go last summer vacation? What did you buy when you went to Delhi last time? What were the questions you have answered in your Psychology examination?

These questions make you to go back to your past experiences and make you to remember something or to struggle with something. If you were able to remember them correctly you feel happy, otherwise you feel miserable. What is actually happening when you remember them and when you do not remember them? Memory is the concept we use to describe the first process and forgetting to the second.

The process of forgetting is always with us, but the prospects of memory system in us eliminates it. Memory system is not a recent invention. It was indispensable to Romans and Greeks in the ancient times. The practice of rhetoric is facilitated by memory system. All human learning is verbal in nature. Verbal learning involves language. The importance of language in human behaviour has created interest in verbal learning and memory. The German Psychologist Hermann Ebbinghaus (1850-1909) was the first to investigate verbal learning and memory experimentally. From that day to the present time experimentation in memory has grown considerably.

WHAT IS MEMORY ?

It would be easy for us to think that memory is a kind of mental storage chest. But it is not. In the common sense world memory is always associated with brains. Memory is a system of process by which learned material is retained. Memory is a faculty by which things are remembered. This faculty is considered as residing in a particular individual. It is an act or instance of remembrance.

Memory may be defined as a complex process which is active and generative in nature and constantly working with learned materials. The more we learn and wider experience we acquire the more we feed our memory. All sorts of materials that come from our environment are the raw materials for our memory. These materials are often received and rearranged and kept ready for use in our memory. Therefore, Smith and Smith define memory as a collection of responses of a specialized and integrated kind which can be used when needed. Memory is often put into work. It may perform simple task as well as complex task. This task may be recognizing a person whom you saw in a marriage or dinner or a complex task like reciting a passage from Othello backward or presenting the philosophy of Plato.

We see in our every day life people often accusing of their own memory as bad when they fail to remember events that took place in their life some years ago. But if we go into the details we could see that we remember many things and we forget things rarely. Are you not recognizing your childhood friends ? Don't you remember how you had learned to play cricket ? You also remember the first motion picture you saw. Therefore, you remember many things. The function of memory is called retention. Retention is a passive process and remembering is an active process. Memory involves both the processes.

In our every day life remembering is taking place in several ways. But we are not aware of it and we are not able to describe it properly. When you want to recall an event or the name of a person you first speak to yourself. Is it Ramasamy or Rangasamy ? Is it Kandasamy or Kumarasamy ? You might have spoken even loudly sometimes. You may fail to recall the name sometimes. But, still you may remember it and not forgotten it. Sometimes you may recognize the event or name even without recalling it. We have learned something sometimes ago and now we want to remember it. Woodworth, a famous American Psychologist has evolved a formula for this process

L — I — R,

where L stands for learning, I for interval time between learning and remembering and R for remembering. The duration of interval time may play an important role in our remembering.

TYPES OF MEMORY

The definitions of memory have given some descriptions of a process. This process is the expression of some behaviour. Therefore, memory is defined in terms of expressions of behaviour. This expression of behaviour can be experimentally studied. If memory is a store house of vast information how these information are fed ? How do we get those information for use ? It is believed that we use these stored information in different situations for different purposes. This assumption leads people to think of several sorts of memory. William James, the famous American Psychologist was the first to think in this line. He differentiated the primary memory from secondary memory. The primary memory or the immediate memory contains ideas that are current and existing for the moment. The secondary memory stores the past information.

From the time of William James to the present time many studies have been conducted and lots of information have been collected about memory processes and these lead to the idea of existence of several kinds of memory. They may be called short-term memory and long-term memory.

The Short-term Memory (STM): The short term memory is sometimes equated with sensory impressions, but it is much better than sensory impressions as sensory impressions are very short lived. The short term memory is somewhat permanent when compared to sensory impressions.

The short-term memory is momentary, but active. It is quite similar to span of attention. The capacity of short-term memory is limited and it can hold only few items. Therefore, short-term memory can be defined as the components of the memory process that have limited capacity and will maintain information only for a short period of time in contrast to long-term memory.

The information or items are retained temporarily for a short duration. Therefore, the items are collected by the process of repetition. The repetition may be done loudly or silently. For example, when you write down an address of some person you use the pincode number of that place. You look the number from your diary and write it on the envelope and immediately forget it. You have remembered it only for a moment till you write it. Like this in your every day life there are several instances in which you use this short-term memory.

If you want to speak to a person over the phone you find out the phone number from the directory and after dialing and speaking to the person you forget the number. Here too you remember the phone number only for a short period. So also you forget the name of a person who was introduced to you newly by your friend. But

you may remember the name of the person who was introduced to you lastly or the number you have learned lastly. In all these instances we fail to reproduce the desired material presented to our memory.

An experiment was conducted by Peterson, L and M. J. Peterson (1959) on short-term retention of individual verbal items. In this experiment a stimulus was exposed to the subject once, for a very short time. A three consonant nonsense syllable such as CHJ was read aloud. Immediately, following the last letter J a three digit number such as 506 was presented. The subject's task in this experiment was to remember CHJ. But he was not allowed to do rehearsal of the syllable. He was asked to count the numbers 506 backward until the signal was given. At the signal the subject tried to recall the syllable CHJ after the intervals of 3, 6, 9, 12, 15 or 18 seconds. After 18 seconds the recall was almost nil. This experiment shows that when there is no rehearsal the loss of memory is rapid. We may state that in this case either forgetting has taken place rapidly or learning has not taken place. This effect takes place after several trials and not during the first few trials. It shows that there has been some interference from the earlier experience. This process is called proactive interference. Proactive interference is the process in which previous learning interferes with memory of the present learning. Short-term memory involves remembering the learned material for a moment and then forget. But if the material is to be remembered for, it must be stored in the long-term memory for which it must be repeated often and rehearsed. If the material is rehearsed sufficiently it may be transferred to long-term memory for permanent storage. Information usually is dying rapidly in short-term memory.

The Long-term Memory (LTM): The long-term memory is the record stage in the memory system. This involves remembering the material learned for a long period of time. It has tremendous capacity for materials.

Long-term memory may be defined as the permanent component of the memory process in contrast to short-term memory. The process of function required for long-term memory is repeated rehearsal.

Experiments have been conducted on long-term memory. But they all examined the process of retention of the learned material after the elapse of long intervals. If a particular information is not rehearsed it fades away after few seconds. But rehearsal is not unlimited. It is not possible to rehearse large number of items simultaneously. Several rehearsals should be made to transfer the information to long-term memory. In this process a task performed by STM is coding. Coding is a process of arranging and organizing the items of information into a compressed form in the LTM so that the information can be remembered if suitable cue is provided. But this process is taking place in such a way that we are not aware of it. By this process of coding, the information in LTM are so highly organized that they become permanent. The learned information attain this stage only after the processes of rehearsing, shifting and coding. But these information are often revised and reorganized when new information are pushed into the LTM.

Further, the stored information in LTM may undergo a process of change in whatever manner we wanted. These information are permanent in LTM. Sometimes we may fail to recall these as the cues are insufficient to do the task. Familiar information are easily assimilated and categorised than unfamiliar information.

ASPECTS OF MEMORY

The concept of memory, according to experimental Psychologists, is referred to an act of reproduction or remembering. Whether it is referred to an act of reproduction or remembering we may be tempted to ask, 'What is to reproduce or to remember?'. The answer is,

what has been learned earlier. Therefore, if anything is to be remembered it implies that it has been learned, retained and reproduced when there is a need. You can reproduce the learned material if only you remember it. Therefore, learning, retention, recall and recognition are the aspects of a memory function. We shall discuss these aspects here in detail.

(1) Learning or Memorizing

In the common sense world learning goes by several names such as memorizing, training, practice, experience, conditioning, fixation and registration. Here we are using the term learning in the meaning of memorizing, because in any memory experiment a person is asked to learn a given material and reproduce it. He at once puts himself actively in memorizing the passage. He will learn something if the material is unfamiliar and new. Since unfamiliar materials are not wholly found, meaningless words or non-sense syllables and numbers are used. In memory test meaningful and familiar materials are also used if lengthy materials are to be learned or memorized. The basic idea in such test is that the subject should make some errors in his reproduction of the material. If the passage is difficult or lengthy this aim is achieved. However, the results obtained from different individuals with meaningful material would not be having equal influence in everybody. But the non-sense syllables such as BEW, ZUR, VOD, NAX, TEW may have equal difficulty to all the subjects as they are not familiar to them. Ebbinghaus believed that every one will start with a blank mind in learning the non-sense syllables. He has designed 2300 non-sense syllables for his experimental purpose.

It is true that meaningful materials are easily memorized than non-sense syllables. The other factors in memorizing meaningful materials are rhythm and rhyme. This is the reason, poetry is more easily and quickly memorized than a prose passage. Meaningful prose pas-

sage is more quickly memorized than meaningless words. Materials which are interesting to us are more quickly learned than the materials which are not interesting to us. Psychologists tried to discover the principle that operates in this process. They call this learning as verbal learning. Any learning that is dominated by language behaviour is called verbal learning. There are two simple forms of verbal learning. They are paired — associate learning and serial learning. An apparatus called memory drum is generally used to study both the forms of learning.

The memory drum is an electrically operated apparatus. The drum is covered by a metal sheet. The drum

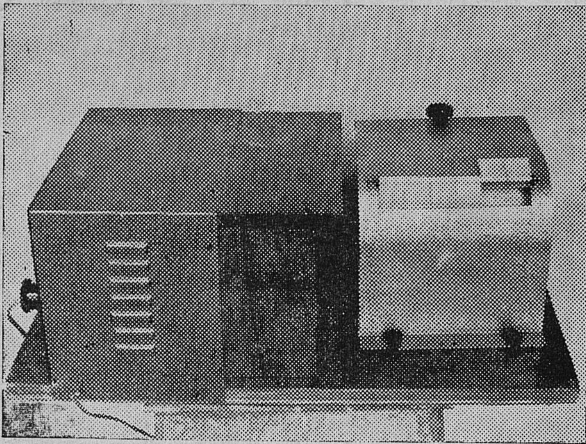


Fig. 2.1. Memory : Memory Drum Apparatus
(Model : Anand Agencies. Poona)

inside is pasted with printed or typed material of non-sense syllables or words with meaning or numbers. The non-sense syllable is a three letter syllable that is not having any meaning. When switch is on the drum rotates and the syllables or words are exposed successively through a small window. The movement of the drum is so devised that each item is exposed only for a short period

of two seconds. After two seconds automatically another item appears in the window. A subject is to sit comfortably in front of the apparatus and look at the small window. He is to memorize each item when appears in the window. Only one item is exposed at a time.

Paired-associate learning : In the method of paired-associate learning the subject learns to associate one syllable with another syllable or one word with another or one number with another number. Pairs of items are shown to the subject on the memory drum. In the pair one serves as a stimulus and the other as a response. The subject is first shown with the stimulus member or the first member of a pair alone. It is exposed for a short period of two seconds in the small window and within that time the subject should give the response syllable (member) or word or number.

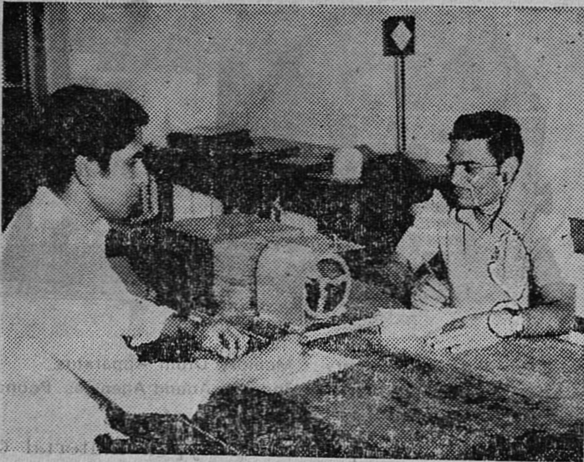


Fig. 2.2 Memory : Memory Drum for Measuring Span of Memory

Immediately after the elapse of two seconds the drum moves and the pair of the syllable or word or number — that is the stimulus and response members appear in the window. The subject is then to see whether he has made

Stimulus (S)		Response (R)
Soft		
Soft	———	Hard
Happy		
Happy	———	Fast
Minor		
Minor	———	Few
Hot		
Hot	———	Sweet
New		
New	———	First
Safe		
Safe	———	Green
Wicket		
Wicket	———	Quite
New		
New	———	Rare

Fig. 2.3. Arrangement of meaningful words for paired-associate learning. The stimulus member is presented first alone and secondly with the response member., These words are adjectives, should be presented in different order.

Stimulus(S)		Response (R)
X E W X E W	——	M U X
C A J C A J	——	K E J
V U Q V U Q	——	Z U Y
D I J D I J	——	Z A J
W O S W O S	——	B O Z
K E W K E W	——	F U H
B A W B A W	——	P I W
Q U T Q U T	——	F O V

Fig. 2.4. Arrangement of non-sense syllable for paired associate learning. The stimulus member should be presented first alone for 2 seconds and then the stimulus-response pair should be presented.

correct response or not. If he had failed to make correct response the appearance of the stimulus-response pair makes him to learn the association. Then the drum moves and the stimulus for the second stimulus-response pair appears in the window. The subject has to give the response for the stimulus. After two seconds the same stimulus member appears with the response member and the subject should see whether he has correctly responded or not. This process is repeated till the whole list of items is presented to the subject. There is a chance for the subject to memorize the order of the stimulus-response pairs. In order to prevent it the order of the items in the list is to be changed in every trial. Therefore, the same list of stimulus-response pairs is arranged in different orders. In every trial, the pairs appeared in different order. The presentation of the list of items continued till the subject is able to respond correctly all the response members in one or two successive trials. Then only the subject is said to have learned the whole list.

Serial Learning: The method of serial learning differs from paired-associate learning in certain respects. Whether we use non-sense syllables or meaningful words or numbers they are presented in a chain like manner. A series of non-sense syllables may be constructed for serial learning. Some symbol (X) is given at the beginning of the list. This symbol serves as a cue for the first syllable.

The same apparatus, the memory drum and the same procedure as explained in the paired-associate method is used here. In the method of serial learning syllables or words or numbers are presented one at a time for a standard time of two seconds in the memory drum. When the drum moves the symbol (X) is the first to appear in the window and the subject anticipates next the first syllable after two seconds. The first syllable is used as a cue to the second and the second to the third and so on. In this way the whole list is presented for the first time. When the list of items is presented one by one for the

second time, the subject sees first the symbol in the window. Then he is expected to say the first syllable that is going to appear next. For example, a list of non-sense syllables is given here. The first is the symbol X. It is presented to the subject in the memory drum. He is expected to say the first syllable FEH within the standard time of two seconds before it appears in the window. When it appears he can check whether he is correct or not. Since he has already seen the list of items once, using the first syllable as a cue he is expected to say the second syllable that is going to appear in the window. He can check whether he is correct or not when the second syllable is seen in the window. The procedure in this manner is repeated till the subject could tell the whole list of syllables correctly in the order in one or two successive trials. He is said to have learned the list at this stage.

X
F E H
Q A M
C I J
D U Y
H O X
G A H
J I S
X A D
W U F
K E J
W O X
Q U V

Fig: 2.5 List of non-sense syllables arranged for serial learning. Symbol X is the cue for the anticipation of the first syllable.

Free learning: Another method of learning has been suggested by Underwood. It is called free learning method. Meaningful material is used in this method. The subject is presented with a series of words visually or orally. He is then asked to reproduce in whatever order he can. In this method the subject is not given any stimulus word. The same memory drum we have used in other methods can be used for visual presentation. The trial can be repeated till the subject reports the whole list of words correctly.

EFFICIENT METHODS OF MEMORIZING

Generally in schools students are asked to memorize certain passages and recite. Certain poetry lines are to be memorized compulsorily. In such cases students find the task very difficult. Because memorizing is a time consuming task. It also takes more efforts. They even go to the extent of swallowing memory pills with a view of making the task more easy. Unless we conduct experiments with memory pills we cannot say anything about the effects of memory pills. But the idea they have in their mind is that they wanted to memorize the passage or poetry easily and quickly. They wanted to save time and effort. For this purpose they try to manipulate conditions to favour this task. One easy and possible method of making the task more efficient is to avoid all kinds of distractions while learning. Let us discuss some of the methods in use.

(a) Rote learning: Sometimes we may use this method of learning, because certain materials are to be learned by rote learning. Rote learning is a general term referring to repetitive task of memorizing of verbal material. It is learning the material verbatim or as it is. For example, learning a poem by heart is rote memorization. By hearting a poem or play or some famous quotations from eminent authors is rote learning. We do not make any change in the material. Particularly in learning nonsense syllables we use rote learning method. It is a mechanical process of learning by repeating the lesson

over and over again. The learner makes slow progress and so he finds that this method is not very efficient.

(b) Learning by observation: Since the learner finds that the rote learning method is not efficient, slow and consumes lot of time he tries to find out some other method by which he can learn the material easily and quickly. One such method is learning by observation. The learner tries to find out the characteristics of the lesson or material which can be remembered easily and puts emphasis on these characteristics. In remembering the faces of persons he puts emphasis on personal qualities of persons. In memorizing pairs of words he finds out the characteristics to make them as a unit. In case of numbers he observes the sequences of the numbers for memorizing. In by hearting a poetry or a scene from a play or a famous speech the most important thing the learner should observe is the meaning of the material. If the meaning is not clear he must work out and find out the meaning for each difficult word or phrase and assimilate the whole material. If the idea of the passage or material is understood in the first reading further readings would facilitate the reader to put everything in the appropriate places.

(c) Spaced and massed learning: Spaced learning and massed learning are two contrasting methods, often discussed in memorization. Spaced learning is a kind of arrangement in learning that allows for time intervals between successive trials whereas massed learning refers to continuous learning with no time interval between successive trials. The merits and demerits of these two methods can be realized when one wants to memorize a lengthy assignment. If a car number or telephone number is to be memorized you can make a single reading and recite the same several times without any pause. But if you want to remember it for longer duration a rest pause should be given for few seconds after every recitation. This method of learning is more efficient than massed learning.

Hovland had conducted an experiment on 32 college students using massed learning in a laboratory setting. The subjects were given a list of 12 non-sense syllables. They were exposed one at a time. Each syllable was exposed only for 2 seconds. When all the 12 syllables were exposed one by one a pause of 6 seconds was given before starting the next trial. The trials were continued till the subjects learn the whole list correctly by the method of paired-associates. This is called massed learning, because there is no sufficient interval between one trial and another. The subjects have taken 15 trials on the whole to master the list of syllables.

Similar experiment was carried out on spaced learning. The procedure was the same as in the previous experiment. But the interval between trials was increased from 6 seconds to two minutes. During the long interval period the subjects were not allowed to recite the syllables. They were given engagement in a test of naming colours. Later it has been found that the subjects have taken only 11 trials to master the whole list of syllables. This is because of the long interval between trials. This experiment concludes that spaced learning saved 4 trials. But it has taken more amount of total time due to the longer rest pauses. Both the methods have certain advantages and disadvantages.

Another similar experiment with little variation was conducted by the same author. This was found to be more economical than the first two procedures. According to this procedure every syllable was exposed to the subject for four seconds with an interval of 6 seconds between trials. The subjects were able to recite the material with 7 trials. Both trials and time were saved. It is a more efficient method of memorizing. It seems that the subjects could make better performance with 4 seconds interval between syllables and 6 seconds interval between trials.

(d) Whole versus part learning: Sometimes we may have to learn a very long poem or lesson. The moment we think about memorizing such materials we feel worried as how to memorize it. Learning the whole material with several trials would be a waste of time. Therefore we must find out an efficient method to master it. From our experience we could understand that dividing the whole material into certain convenient parts would be profitable.

Pyle and Snyder have conducted experiments on the economic unit for committing to memory. In this experiment a young man was made to learn a passage of 240 lines of a poem by whole method and by part method. The same number of lines from the same poem for each method was given. He spent each day about 35 minutes sitting and learning. In the whole method he made 3 readings of the whole material per day till he was able to recite the passage correctly. For this he has taken 10 days and the amount of time spent was 348 minutes. In the part method he memorized 30 lines per day till he could recite the whole passage correctly. The number of days required was 12 days but the amount of time spent 431 minutes. It is understood from this experiment that the whole method was more economical than the part method. It had an advantage of 83 minutes over the part method and saved 20 per cent of the time. Therefore the whole method seems to be more efficient than the part method.

(e) Recitation: Every material we learn requires certain amount of recitation. Recitation reinforces our learning. Recitation, generally means repeating the learned material silently. It is a kind of verification of our own memory. After reading a passage two or three times the learner tries to recite it to see whether his learning is correct or not. If it is struck up somewhere he can read it once again and recite it. We can verify whether the method of recitation is advantageous or not. Gates had designed an experiment to test whether reci-

tation is advantageous in memorizing on eighth grade children. Sixteen non-sense syllables and 5 short biographies with 170 words were used as reading materials. There were five categories in the distribution of learning time. In the case of first one all the given time was devoted to reading. In the case of second 1/5 of the study time had been devoted to recitation. In the case of third, fourth and fifth 2/5, 3/5 and 4/5 of the study times were devoted to recitation. It was found that recitation had definite advantage immediately and after 4 hours in the case of both non-sense syllables and short biographies. Recitation is much better than continued re-reading of the same passage.

(f) Mnemonic devices: Mnemonic devices are the techniques by which material is made easier to remember. It is a system of improving memory. The technique involves a set of symbols that can substitute the material to be remembered. For example, a number can be used as a substitute for a word. The learning material is organized in such a way that it helps us to remember the material easily and quickly. The learner when uses the mnemonic device he purposely puts some order in the material to be learned. He may use any systematic order. He may use meanings or groupings or rhythm as means.

The simplest mnemonic devices are rhythms and jingles to remember the data and facts. The colours of the spectrum are remembered if we know the word VIBGYOR. The word stands for colours like Violet, Indigo, Blue, Green, Yellow, Orange and Red. Some of the psychological tests are remembered in the same manner. For example, tests like MMPI, FACT, EPPI, DAT, TAT all remembered by some mnemonic devices.

The number-peg technique is a mnemonic device that helps us in serial recall. Every number is imagined

as a picture on the basis of the shape of the number. For example, 1 is as a pillar, 2 as a cock, 3 as a pitch-fork and so on. It is found from the studies made by Smith and Noble that persons who had training in mnemonic devices were able to recall meaningless words better than those who are not trained in that line.

2. **Retention**

What is retention? Retention generally means the ability of retaining information or events in memory. Retention is the function of memory. It is holding on the information or events in memory. It may be also stated as the registration of information we have collected in the memory.

Retention is one of the important elements in human learning which is making us to function as the superior being. In the absence of memory man is almost a mute. According to Gerard man is not benefitted by his experience or intelligence in the absence of memory.

Authors like Gerard define memory in terms of retention, because it is the way through which memory can be traced. Therefore, memory is defined as the process of retention that makes us to relate one thing with another and transfer things to new situations.

How do we know whether we have learned some-thing? It is only through performance that we come to know of it. How much do we perform from the past learning? The procedure used in finding out how much we have learned is measuring retention. We can measure retention.

Measuring retention: In testing the validity of our memory we measure only the retention. If a test is conducted to measure how much material is retained in our memory we could see that we don't retain every-

thing we learn and we don't forget everything. But our retention is influenced by certain factors. All those factors that influence learning also influence retention. You might have prepared to deliver a speech in an organisation. After concluding the speech and leaving the platform you may remember an important matter you have failed to speak on the platform. How your performance is affected by certain factors? Motivation may be one of the factors, influencing performance. A reward may have influence in the performance of a dog, or cat or a child. What kind of performance can reveal retention? Psychologists have devised certain methods by which the amount of retention can be revealed.

Suppose, for example, your teacher asked you to come with preparation to recite a particular poem next day. You have memorized the whole poem that night. Next day you recite the poem in the class room. You are able to do it word by word without any effort. That means you are able to recall the poem perfectly. But, suppose you are held up at certain place with some line not coming to you as the other lines. When your teacher helps you by telling what that line is with one or two words from that line you are able to know that line and proceed further. You are able to recognize the whole line when once you hear one or two words from it. This makes you to think that you are not perfectly remembering the poem and so you memorize it once again. This is called relearning. Now you are not taking many trials for memorizing. You learn perfectly within few trials. This kind of relearning is easier than learning it for the first time. This re-learning saves time and effort.

Recall, recognition and relearning are not three separate processes. They are three methods of measuring retention. These three methods differ in sensitivity to the material learned. Recognition is more active than recall because it identifies at once what is not recalled

whereas recall is only recitation. So also relearning is more active than all of them. It reveals what we have retained.

3. **Recall**

Recall involves repeating what we have learned something already. It may be defined as the reproduction of some specific material learned previously. It is reciting the material as it is or verbatim. In recall there is also some kind of reconstruction. While you are answering an essay type of question in the examination you are recalling all that you know relating to the answer and reconstruct the material. You also try to arrange the material in an orderly fashion. For example, if two events are to be stated in your answer you try to put them in the order of occurreance of these events. This method of arrangement is taking place in our recall and reproduction.

Recall may be serial recall and free recall. In serial recall materials are often recalled in the same order in which they are learned. It has a specific order, the first will come in the first and last will come in the last. On the other hand, in free recall pieces of information are recalled. The information need not be in the order. Any matter may be put in any place or order. This is occurring when you want to quote some idea from a passage once learned.

While you are recalling the learned material you may succeed or fail. All unwanted material not relevant to the situation or purpose may come crowded when you try to recall. The material we wanted may not be appearing in our recalling. All of us might have had this kind of experience and we may be also using this term recall on several occasions. "Could you recall those days when we used to play under this tree?" "Do you recall the name of the old man who told us novel stories from Ramayana and Mahabharatha?" Such uses

of the word 'recall' are quite common in our everyday life. But in experimental studies psychologists are interested in the amount of information recalled and the accuracy of recalling. The method of paired associates we have described earlier is used for this purpose. Studies of this type show that recall is effective if the set is to form a particular association. For example, if the set is to colours of the objects your recalling should be successful with regard to colours, but not to shapes of the objects. Your answer to the question in the examination is a method of testing your recalling of the learned material. You write everything you know about the matter. You use both serial recall and free recall. Here retention is tested by your ability to recall and reproduce the learned material.

4. **Recognition**

Measuring retention by using this method is becoming more popular in recent times. One of the uses of this method is the change in the pattern of question papers. One of the patterns is the introduction of multiple choice type of questions in the examinations. What is required here is whether the student is able to recognise the correct answer from the number of alternative answers. The student's ability to identify the correct response is tested in this way by the recognition method. Therefore, recognition may be defined as the capacity of the person to identify the learned objects or materials when presented along with other objects or materials. Recognition is the measure of retention. Certain materials we do not remember or recall when we want, but when we see them or hear them we at once recognise them.

For example, if you are asked to answer the question: "Who has set up the first Psychological Laboratory?" "In which year?" You may struggle to find out the correct answer even though you know it. But if you

are asked to answer the same question by the recognition method you would readily give the correct answer. For example:

Who has set up the first Psychological Laboratory? In which year?

Check the name and the year below:

I. (1) Watson
(2) Pavlov
(3) Wundt
(4) Galton

II. (1) 1879
(2) 1789
(3) 1899
(4) 1889

In questions like these you would immediately recognize the correct answers and check Wundt and 1879 in your answer book.

Recall involves more strain. Recognition involves less strain, because the learned and stored material is before you and you are required only to decide the right one. The task is whether to accept or reject the object or information. In testing retention by recognition method the materials ordinarily used are pictures of human faces, words and things experienced before. The ability to recognize a material depends upon three factors such as the structure of the object and its relation to ground, past experience with the object and set or strength of motivation.

Experiments on recognition were conducted by Edwards by using pictures of faces of Negroes and White students. Seen Negro faces were mixed with faces not seen previously and seen white faces were mixed with faces not seen previously were presented to many white

students. They were asked to pick out faces they had seen before. The scores in recognition test were mainly depending upon the attitudes the white students have developed towards Negro students. Long list of words also may be used in the same manner in recognition experiments.

Method of relearning: The method of relearning refers to the process of learning again a material already learned when one has failed to recall and recognize it. It is also called savings, because relearning saves certain amount of time in learning. How time is saved by the method of relearning? Let us explain this. For example, you have memorized a poem or a passage from a book for which you have spent 100 minutes or 20 trials. After twenty days you wanted to recall and recognize it. But you are not able to do the whole material successfully. At certain places you had to stop and struggle because a particular line is not recalled by you. This shows that you have not learned the poem or passage properly. Therefore you begin to learn or memorize it once again. This process is called relearning. This time you are able to learn and recall the whole material in 60 minutes or 12 trials. This shows that you are able to save 40 per cent of the time and effort by the method of relearning. Experimental studies show that the effect of retention is greater and the result of recall and recognition is accurate when the material is relearned.

HOW TO IMPROVE MEMORY?

Everyone might have had occasions to speak about his own memory or somebody's memory. Either you might have boasted about your own memory or blamed it on such occasions. In the case of another person you might have admired his memory for the tremendous power of remembering many things or blamed him as a man of poor memory. Generally people are worried over their poor memory. Particularly the students at the time of examination worry about the retention of the learned materials. Many people complain about their memory

power. There is nothing wrong in their memory. It is sound. But the method of learning and retaining the material may be wrong or defective. They must know the right method of attacking their problem. If the problem is with regard to retaining or remembering the learned material what is the successful method to do it? Psychologists have devised certain effective methods of learning to improve retention. Suitable methods suggested earlier can be used.

1. First of all the material should be liked by the learner. He should develop interest in the learning task. Any amount of memorization will not have effect if material is learned without any interest or motivation. Continuous mechanical repetition will be less effective, whereas a desire to learn will have better effect with few repetitions. We should not think that material learned for examination is for a short time. We must know that it is going to be useful for us in the long run. If we realize the use of it we will have better capacity to receive the material for longer duration.

2. Secondly the material should be presented in an organized manner. There should not be haphazard presentation of the material. The points should have logical sequence. Materials with logical subunits can be easily learned and retained for long time. For example, consider the following two sets of words:

I. Monday, April, West, Tuesday, Boy, January, East, Teacher, Wednesday, North, School, March, Girl, South, February, Friday, Book, Head-master, Thursday.

II. North, South, East, West, January, February, March, April, Monday, Tuesday, Wednesday, Thursday, Friday, School, Head-master, Teacher, Boy, Girl, Book.

The second set is easier to learn than the first. It is possible to recite the whole material by reading once

because of its organization. The whole material is having logical subunits.

3. It is possible to learn and remember the material if the meaning of the material is wholly understood and also if we could relate it to the material that we have learned previously. If the passage is with difficult words understand the meaning of the difficult words with the help of a dictionary.

4. We can build up good memory by associating the learning material to some objects and events. While we teach a child with some new lesson the learning material must be presented with some objects. For example, the alphabet A may be associated with an object like apple. Thus A for apple, B for book, C for cat, D for dog and so on. Associations like these can be made even for difficult and complex materials.

5. The learned material should be practised or utilized in some manner. For example, when a child has learned a word he should be made to apply it and practice it wherever possible. Because immediate practice builds up good memory. Recitation is a kind of practice, which is very much useful in retaining the learned material.

6. The mnemonic devices are found to be good methods in helping us to remember materials quickly and easily. The mnemonic device is a method of organizing materials. A person, in mnemonic device, consciously puts certain system or order in the material he learns. He can use meanings, rhythms and groupings as means of organising the material. It is said that the ancient Greek and Roman orators were using the mnemonic devices to remember long speeches as they have to deliver them without written notes. A simple mnemonic device is making sentences or words out of the material to be recalled. Another device is the number-peg technique. Every number is attached to a picture similar to the

shape of the number. For example, the number 1 is a pillar, 2 is a cock, 3 is a jug and so on.

7. Improvement of memory mainly refers to the process of retention. It requires proper learning or reviewing of the material and also avoiding interferences. But for all these an organism must be kept in good condition. A good brain is very essential for a good memory.

It is believed in the early 19th century that memory can be located in certain parts of the brain. Phrenologists believe that memory centre is located in the brain just behind the eyes. They thought that a person with protruding or bulging eyes would have bigger memory centre and a greater capacity to remember things and events. But Lashley a famous physiological psychologist in 1950 has stated that there is no particular part of the brain which is responsible for our memory.

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Chapter 3

FORGETTING

WHAT IS FORGETTING ?

In our everyday conversation we may be using the concept 'forgetting' several times. It is used for both good and bad purposes. It is involved in the process of learning. Forgetting is the opposite of remembering. It is also stated as the failure of retention. We are thinking that much of what we learn is forgotten. Psychologists attempt to make a thorough study of this process as it is associated with cognitive process.

It is true that we restore what has been forgotten by frequent reviewing or learning. However, our control of forgetting will be much more effective if we know *more about the facts and principles about forgetting.* One trouble we generally come across in life is that what we want to remember is not remembered and what we want to forget is not forgotten. Men have painful feelings when they could not forget the unhappy events of their life. They even pray God to bless them with the capacity to forget wretched things they have done.

To the question, **'how to forget ?'** has the Psychologist got any answer to offer ? Yes. The answer is given in the following:

1. If you want to forget certain thing, the rules to be followed for remembering should be given up.

2. Never indulge in reviewing it after the incident or after learning.

3. A change of place, from the spot where the calamity occurred.

4. Keep yourself engaged in vigorous physical work or in some kind of new activities to the point of exhaustion. This will cause fatigue and generate sound sleep. As a result, there will be little chance for brooding or reviewing.

5. Dispose the matter to an ultimate logical conclusion. By making it, into a closed chapter, forgetting becomes easy. In this approach, the factor of preservation will be losing its power, since the task becomes fully completed, instead of half-finished.

6. Finally, time helps us to forget. The saying that 'time is the great healer' is not due to time as such, but due to many things that occur during that period.

Forgetting need not always be working to our disadvantage. To some extent forgetting is a blessing in disguise to the human beings. However, there are several matters in life which we should not forget. It is important to know, what exactly happens when we forget.

Forgetting may be either retention amnesia or recall amnesia. Amnesia means total or partial loss of memory. In the case of retention amnesia, retention itself is very poor. So to strengthen retention further learning is needed. Whereas with recall amnesia, there is an inability to recall but at the same time retention is found intact. So to overcome recall amnesia, a great amount of encouragement is required. Recall amnesia usually occurs because of blocking in the process of recalling. This blockage is often due to emotional disturbances such as fear, anxiety or self-consciousness.

We might be thinking that forgetting is a passive process, quietly taking place with the passage of time. But experimenters have found that forgetting is an active process. For example, whenever we recall a story, we do not accept generally that we have forgotten cer-

tain details. But more often additional details are supplemented in the places where we have forgotten, without any kind of conscious desire on our part. Further we have a definite feeling that we are recollecting exactly as in the original. Among several psychologists who had conducted experiments on this interesting phenomenon, it is worth to mention the name of Professor Bartlett of Cambridge University.

If there is any forgetting within us there is some unconscious effort to fill up the gap. There are two views to explain this process.

According to the first view, there is a tendency to distort the learned material. This tendency starts even at the time of learning. It is considered that this process of distortion is taking place in an unconscious manner. Some of the materials are distorted at the time of learning according to our likes and dislikes, attitudes and prejudices. We ignore even some of the important facts and substitute them with what we liked very much. This process of fixing of substitute material in our memory is taking place unconsciously.

The second view is that it is generally believed that we do not feel happy with anything which is incomplete or incoherent. Therefore, there is a constant desire in us to make things complete. When we forget some points in a story, we beecome dis-satisfied with the event and we take care to fill-up those gaps with some other points which may be more appealing and dramatic. Thus a completed story is produced ultimately even though it is deviated from the original. What is most important in this process is that we drop out all those things we dislike and add all those things we like. This process is taking place unconsciously without any effort.

Why do we forget ?: We forget learned material because of the lapse of time. We forget things as the neural traces of our previous experiences grow fainter

and weaker. Time is an important factor in forgetting. Every day we learn many things and come across several events in life. As the time passes on the past events become old and present day events become new. Therefore events that took place recently make the neural traces of the past experiences weaker and thereby make us forget. But when materials learnt in the past are drilled in thoroughly and repeatedly, they are not easily forgotten. It has been found that the rate of forgetting depends upon the thoroughness and adequacy of the learning.

1. Forgetting is slow when the meaning of the material or passage is understood well.

2. Forgetting is slow when there is active recitation or reviewing.

3. Forgetting is slower in the case of the materials learned by spaced method (distributed practice) than to the unspaced method (massed practice).

4. The process of forgetting is slower for the materials learned by whole method than by the part method.

5. Forgetting is based upon the passage of time. The relationship between forgetting and time is such that when the time increases the amount of forgetting also increases, but at a decreasing rate.

6. The rate of forgetting is dependent upon what one does after learning.

SOME EXPERIMENTAL STUDIES

(1) We shall now discuss a few experimental studies carried out by some eminent psychologists. One of the important and earliest studies was made by **Hermann Ebbinghaus**. He has published the result of his extensive studies on forgetting in the year 1885. One of the significant findings of this pioneer psychologist being that forgetting is a function of time. And this fact is illustrated through a curve of forgetting drawn to the

results of the experiments on for nonsense syllables after various time intervals.

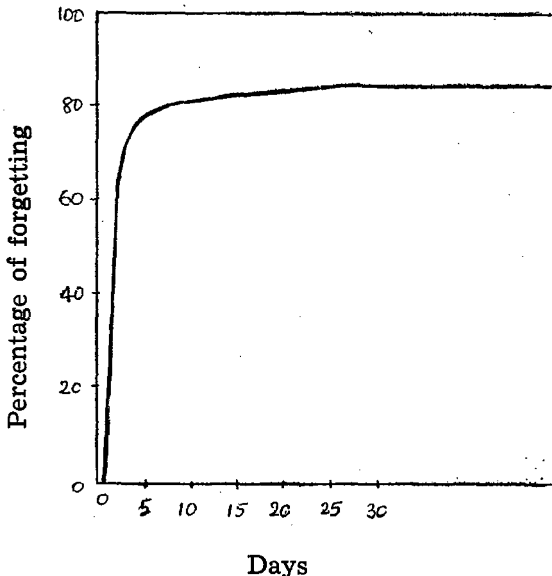


Fig. 3.1. Curve of Forgetting

Ebbinghaus found that the amount forgotten is very large, immediately after learning. But the amount forgotten per period of time decreases, when the duration of time continues to extend further. The relationship between duration of time and the amount of forgetting is represented by the curve shown in figure 1. According to this curve the amount of forgetting will be more in 10 days time interval than in 5 days time interval. In other words, the amount forgotten will be usually lesser in a shorter interval than it is in the longer interval of time. This statement follows from the fact, that the forgetting curve tends to rise with the increase of time.

In another study, Ebbinghaus found that the amount of forgetting in a 24-hour time interval was three times

greater than in the 15-hour interval. It is proper for one to expect more forgetting in the longer interval than in the shorter interval of time. But never one would expect forgetting in the 24 hour period to be three times greater than in the case of 15 hour period. This matter has been settled by Ebbinghaus himself later by suggesting that it might be due to the reason that more is forgotten in a waking period than in a sleeping period, when both the periods are of equal length.

(2) The hypothesis that 'more is forgotten in a waking period than in a sleeping period' was originally formulated by Ebbinghaus. This was taken up by **Jenkins and Dallenbach** forty years later, in 1924, by designing an experiment to verify the same.

Lists of nonsense syllables were given to two college students and the experimenters asked them to memorize the same. Each list contained ten such syllables like 'BOQ'; 'KOG'; 'SEG'; 'MUC'; 'ZER'; and so on. The subject had learned some of the lists just before he went to sleep. Such lists were recalled 1, 2, 3, 4 or 8 hours after learning and the subject was made to get up specially to do the task of reproducing memorised material. But other lists were learned in the morning and the subject recalled 1, 2, 3, 4 or 8 hours later and unlike before, the interval between learning and recall was without sleep.

This kind of procedure was followed for both the groups subjects. The results showed that both the groups recalled more after 1, 2, 3, 4 or 8 hours of sleep than after similar periods of waking activity.

One subject after 8 hours of sleep recalled an average of 5.5 syllables. But the same person after 8 hours of normal waking activity recalled only an average of 0.4 syllable. In a corresponding way the

results obtained for the other subject were 5.8 and 1.4 syllables.

It is clearly evident from the results that the rate of forgetting for this kind of material is lesser when the interval after learning is filled with sleep. But at the same time the rate of forgetting is greater when the interval after learning is filled with normal waking activity.

(3) Jenkins and Dallenbach had used lists of nonsense syllables in their experiments. Subsequently **Newman** tried to verify whether the results arrived at by Jenkins and Dallenbach will be valid even for meaningful material.

Newman in his experiment used three short stories. These stories were constructed in such a manner that each of them contained a number of items that were essential (meaningful) to the plot and a similar number of items that were not essential (less meaningful) to the story at all. Eleven College students were used as subjects. They read each story at a different time of the day and roughly 8 hours after reading they reproduced it.

Comparison was made between the amount of forgetting of essential material, and the amount of forgetting of non-essential material, both after sleeping and after waking states.

At the end of the study, the results revealed that there was no difference in the amount of essential material forgotten both after waking and after sleeping states. But in the case of nonessential material, the amount forgotten was two times greater when the interval was filled with waking than if it was occupied by sleeping. In the 8-hour period, the percentage of forgetting was very much greater for the non-essential than for the essential material.

Do we completely forget anything ? We do not completely forget anything. This is because we know from experience that we retain much, although we cannot recall them. More often students are able to recognize answers to the questions but at the same time they are unable to recall the same. This shows that something has been retained even though they are not recalled.

In some situations, events and experiences can never be recalled. These events may be recalled in exceptional circumstances such as in dreams; in somnambulistic state (sleep-walking); in the delirious condition of a fever; in automatic writing; in crystal gazing; in hypnotic states and in psychoanalysis.

TYPES OF FORGETTING

Forgetting as a process of experience can be classified into two broad categories. They are (1) Normal forgetting and (2) Abnormal forgetting or Pathological forgetting.

1. Normal Forgetting

Most of our forgetting is normal forgetting. It occurs generally due to three causes. (a) Atrophy or decay through disuse, (b) Interference effects and (c) Motivated forgetting.

(a) Atrophy or decay through disuse: This kind of forgetting usually takes place with the passage of time. A skill for example, is liable to be forgotten if it is not practised for a long time and kept in disuse. A geometrical theorem even if it was mastered thoroughly might be forgotten in due course, suppose it was not frequently put into use and practice in the event of solving a problem. It is evident that occasional reviewing of what has been learnt and also applying the general principles once understood, will immensely help the process of retention.

Here it is assumed that learning leaves a 'trace' in the brain. This memory trace involves some sort of physical change, which was not present, prior to that learning. The normal metabolic processes of the brain, with the passage of time, cause a fading or decay of the memory. So the memory traces of the material learned once upon a time gradually disintegrate and finally disappear altogether.

We often forget pictures, faces and stories. This suggests that a process of fading with the passage of time is taking place. When a picture is perceived at first, it may show a wealth of detail. But as time passes away, the details are rapidly forgotten and only the general outline is remembered. Similarly, ordinarily learned material is rapidly fading. This kind of experience provides support to the point of view explained above.

It is true that some forgetting may occur because of organic changes in the nervous system with the passage of time. But, there is no direct evidence to support the view of decay through disuse. Critics remark that there are several instances which clearly convey that learning is retained over long intervals of time, even without intervening practice. For example, most of the motor skills such as cycling, typewriting, swimming, driving etc., are not easily forgotten. Generally we do not forget how to swim or drive a car although for several years we might not have practised these skills.

It is surprising to note that some verbal material is retained for long periods whereas other material is forgotten. For example, you may be able to recall perfectly a poem which you have memorized long ago when you were in the 5th or 6th standard. But at the same time you are unable to recall a poem studied last year. Now the question that crops up in our mind is, why should the decay process affect only the later material but not the first material ?

Another criticism levelled against the explanation of decay through disuse, is the recovery of memories which have been supposedly lost. It is mostly common among the people who are approaching senility to often vividly recall events of their youthhood days when they can hardly remember the events of that day. Therefore we are to conclude that unavailable memories have not necessarily 'decayed' or forgotten.

(b) Interference effects: According to the theory of interference, what we do in the interval between learning and recall is responsible for forgetting. That is to say new learning may interfere with the recall of old learning (that which is learned previously) and vice versa.

The effects of interference is nicely illustrated by a story told about Standford university's first president, David Starr Jordan who was an authority on fishes. As the president of a new University he began to call the students by name. But every time when he learned the name of a student, he forgot the name of a fish. So it is said that he gave up learning the names of students. Though this story has no foundation of fact, still it explains how new learning may interfere with the recall of old learning.

The term 'interference' here denotes that different memory traces are overlapping and disturbing each other. This gives a warning that we should not try to learn too many things at one and the same time.

There are two types of intereference: (1) Retroactive Inhibition and (2) Proactive Inhibition. In the former type, the new learning interferes with the old learning whereas in the latter type old learning interferes with new learning.

Retroactive inhibition: Retroactive inhibition can be explained easily through an experiment. The experimental arrangement can be diagrammed as given below:

Arrangement for testing retroactive inhibition			
	Phase 1	Phase 2	Phase 3
Experimental group	Learn list A	Learn list B	Recall list A
Control group	Learn list A	Rest or unrelated activity	Recall list A

The subject first learns a list of nonsense syllables, from list A, and again learns a second list B. After an interval, the subject attempts to recall list A. If the control group's (which has not learned list B) recall of list A is significantly better than the experimental group's (which has learned both the lists) recall of list A, we consider that the difference is due to retroactive inhibition. That is to say we infer that the new learning (of list B) has interfered with the recall of list A. In other words, what we learn at present may make us forget, what has been learnt before.

Proactive inhibition: Proactive inhibition is another kind of interference. What we have previously learned (old learning) interferes with the recall of something newly learned. The experimental arrangement can be diagrammed as follows:

Arrangement for testing proactive inhibition			
	Phase 1	Phase 2	Phase 3
Experimental group	Learn list A	Learn list B	Recall list B
Control group	Rest or unrelated activity	Learn list B	Recall list B

Experiments using the above design have shown that the control group had recalled better than the experimental group. This is because of the proactive inhibition encountered by the experimental group. That is to say, the prior learning (previous learning of list A) of the experimental group has interfered with their recall of new learning (of list B).

(c) Motivated forgetting: The role of motivation in a person's remembering and forgetting is having a special significance. Pleasant engagements are seldom forgotten by the person whereas unpleasant ones are easily forgotten in day-to-day life. Therefore motives of an individual play a vital role both in the process of remembering and forgetting.

2. Abnormal Forgetting

Abnormal forgetting is also known as pathological forgetting which is rather quite peculiar and unusual like amnesia. Amnesia is a special kind of forgetting which should be properly differentiated from ordinary forgetting. The term 'amnesia' refers to a loss of memory resulting from damage to the brain. It is a total or partial loss of memory for past experiences. However, the memory is not completely destroyed in amnesia.

The amnesia patient does not forget everything. In fact, he carries out his current activities through his rich store of memories. But he forgets certain matters such as personal reference like his name, his family, his home address, his personal biography, etc. The origin of the amnesia can often be traced back to some severe emotional shock which the person suffered and from which the amnesia provides him an escape. Amnesia cases which come under psychotherapy occasionally provide rather convincing evidence of repressed memories and later recovery from the repression.

Abnormal forgetting takes place due to certain unusual and striking circumstances. It does not depend

upon the time factor. It has nothing to do with factors like meaningful learning, role of interest, effects of overlearning and reviewing, etc. It invariably occurs soon after an experience.

There are two causes for abnormal forgetting. They are (a) Exogenic forgetting and (b) Endogenic forgetting.

Exogenic forgetting : This is occurring from outside causes. For example, a severe injury to the brain, like a fall could damage the brain and disturb the memory process badly. Since this is more of a neurological type of case it would require more medical attention.

Endogenic forgetting : This kind of forgetting is arising from causes from within. Many of our experiences are just completely forgotten in the flash of a second because of the working of a particular phenomenon called 'repression'. Since the experience is simply pushed into the unconscious mind, the individual concerned will not be aware that it has been drawn from within. As a result, the individual will have complete recall amnesia. This occurs due to emotional conflicts leading to conditions of psychopathology. The forgotten materials under this situation can be brought out only by psychotherapatic methods like hypnosis, dream analysis and free association.

Therefore, the phenomenon of abnormal forgetting is brought out by repression to individuals. Sigmund Freud, the founder of Psycho-analysis was the first to explain this. The abnormal forgetting is also called intentional forgetting and convenient forgetting but the intention of the individual is not a conscious one.

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Chapter 4

THINKING

Man establishes his superiority in the animal kingdom only by the process of thinking and reasoning. He excels all other species in a wide variety of cognitive skills. Physically and instinctively he is not superior to animals and birds, but still he could conquer them by his wide range of cognitive skills. Most of our thinking depends upon prior learning and most of our reasoning is a process of abstraction.

If you are not having any serious work to do you keep yourself thinking on something or engage yourself in daydreaming. While you are engaged in some heavy physical work you have no much scope for thinking. You put yourself physically and mentally in the particular work. But when you have a problem to solve or have a plan to work out you keep yourself in thinking about those things.

WHAT IS THINKING ?

Thinking is, generally, a kind of behaviour carried on in terms of ideas or symbolic processes in connection with solving some ideational problem. This process is distinguished from solving a problem through overt behaviour or manipulation.

Thinking may be also defined as the internal processes that are representing the previous experiences which could arouse images. Whenever we speak about thinking we never hesitate to use the terms conscious, mentalistic, private, or subjective. This infers the idea that thinking may possess these characteristics. Since we

could make very little scientific progress on thinking we say, it is abstract.

Man is distinctively a thinking animal. Aristotle, the famous Greek philosopher said that man is a rational animal, because he is capable of rationalisation. Man bends over his desk with his pen and paper to work with. While sitting in a lounge sofa sometimes he forgets himself and the world. What is that he is doing? We say that he is in deep thinking. Every one of us sometimes behave like this. We begin to live with our inner activity. We may be planning some long range programme or some great achievement in our life by manipulating some change in the environment.

Man is also a doing animal. Whether the activity is simple or complex depends upon his previous thinking. He has planned something earlier and now he is executing the same. Therefore, planning is a form of thinking. Thirdly, man is a talking animal. He speaks out what he has thought little earlier or few seconds ago. Man's thinking resulted in inventing language through which he communicates his thoughts to others. Talking is also a kind of thinking. J. B. Watson says that talking is a louder thinking and thinking is silent talking. Ultimately man directs his own behaviour by his thoughts. Man plans his own behaviour and anticipates the consequences of his own actions.

TOOLS OF THINKING

In the process of thinking there are three important aspects. They are Symbols, Concepts, and Language. These are called tools of thinking. Your friend, sometime might have asked you what you were doing about? Your answer might have been, "I was thinking about my teacher." What does this thinking involve? Let us discuss this. First of all at the time of thinking about your teacher you might have had the image of your teacher, particularly his face, eyes and his voice. Some-

times your image might have been on his clean and neat dress. Then you fix up certain concepts that you wanted to use when you think of him. When you want to place him in certain categories, you connect him with your previous experiences with other teachers in your school or college. Lastly you use certain words from your language to identify him in your thinking and reveal your thoughts about him. By this means you convert him into some kind of symbols. Therefore, symbols, concepts and language are the three important aspects of thought. These three must be combined in some form to express human thinking.

Symbols: Man has tremendous amount of capacity for learning and also ability to make use of what he has learned. More than that he has unlimited amount of capacity to expand his learning ability by the process of symbolization. Man's ability to learn and to remember is simplified by the symbolic processes.

A symbol is an internal representation of a stimulus or an aspect of stimulus or a response or response aspect. This stimulus or response or the aspect is not present at the moment. A symbol stands for a stimulus or for a response. This might have already occurred in an event or situation or is about to occur in certain situation. For example, we might have made a symbolic statement that there was cyclone yesterday. In this case a response has occurred. You knew the situation that has caused the cyclone yesterday. It was the depression of weather that has caused the cyclone. The depression of weather was the stimulus and the cyclone was the response. On the basis of this event already occurred you can make a symbolic statement like this: "A cyclone is going to take place as there is the depression of weather."

Further, a symbol also indicates the quality of a situation or event when that quality is not present or revealed in the situation. In this case you can make a

symbolic statement like this: "The way of approach to solve the problem is not correct."

Therefore, a symbolic process may be defined as the utilization of symbols in making decisions, solving problems or adapting to the situations. We use symbols for places, objects, persons and even to ideas. Symbols help us to talk about New Delhi when we are in Madras, to talk about the President of India when we are sitting in the class-room, to decide what we should buy before going for shopping, to predict how the student is going to solve the particular problem. Symbols help us to make our communication being easy and successful. Human activities in the everyday life would be much affected without symbols. It would not be possible for us to discriminate one thing from the other. Only with help of symbols communication through various channels make the world very busy. Without symbols it would not be possible for us to express our ideas, solve problems, and to make our future plans. Man has invented language upon symbols and symbolic processes. The symbols and symbolic processes in turn influence the development of language.

What we call symbols are only ideas and the symbolic process may be referred to an ideational process. Ideas are often considered as synonymous with images. Images refer to sensory experience which cannot be experienced in the absence of an appropriate external stimulation. We have sometimes vivid visual, auditory, Kinesthetic experiences in our imagination. We utilize such images for our symbolic thinking occasionally.

It is often stated that the prefrontal area of the cerebral cortex (area of the frontal lobe) is mainly responsible for the formation and utilisation of symbolic processes. However, the efficient use of symbols increases as a function of the cerebral cortex in the development of the individual. In all human symbolic activities language is greatly involved. In certain situations you

may use language but in certain situations you may use certain visual cues — a visual image of an area you wanted to visit. In either case you use symbols in solving your problem.

Concepts: The term 'concept' is used in a broader sense. Fundamentally, it refers to an idea. It also refers to an idea representing the meaning of a universal term. Therefore, we can also state that the meaning of a word is a concept. It also comprehends the essential qualities of a class or species. Concepts are categories for classifying specific objects, persons, animals and events on the basic of common elements. A concept may be also stated as a response made to some aspects in a situation which can be later on generalised for a new situation or some other situation which contains the same aspects.

The world in which we live is full of objects of different kinds. These objects possess certain common qualities that make them different from other objects. When a person learns to respond to this common quality of an object and learns to ignore other aspects he is said to have learned a concept. For example, the child slowly learns to comprehend persons, objects and events. He sees a pencil and understands it as a pencil and it is used for the purpose of writing. He differentiates it from an ordinary piece of stick or a pen. Secondly, when he sees the pencil, he sees it as red in colour and differentiates it from a green pencil or from other colours. In this context the child has learned the concept of redness and also has learned to differentiate the properties of the same object.

When a person develops a concept of a chair he deals with it as furniture. All those objects that have a seat, four legs, a back and two arms are called chairs. Whenever he sees such an object he calls it a chair. If he hears the voice of some one saying a 'chair' he forms the picture of the chair and is able to describe it. Other furnitures also may be having a seat and four legs. They

are not called chairs. In this way, when correct generalizations are developed they are called concepts.

CONCEPT FORMATION

Concept formation is the process of discovering some characteristics that is common to series of objects. It refers to the description of this common element. It differentiates the quality of one object from another. In the example, we have used the concept of a red pencil and a chair. Pencil may be red, green, blue or yellow. But all pencils are made of wood and lead. This common characteristic differentiates them from pens, ball point pens, sketch pens and other writing materials. Concept is formed like this. The concept is that all pencils are made of wood and lead. Children learn, colour concepts and number concepts easily. Concepts function to generalize, to differentiate and to abstract in our thinking process.

There are two important psychological processes, operating in the concept formation. They are generalization and discrimination. If we see a cow, we can assign it to our general concept animal or mammalian. Just like other animals the cow has four legs, a tail and two horns. Secondly, the concept cow helps us to dif-fferentiate this animal from other animals. From personal experience, reading, and from some other sources we understand that most cows are harmless animals. Therefore, we will not react to a cow with the alarm that we would show to an elephant or bull. Thirdly, we may use this concept cow for abstracting without making mention to any specific animals. In this process the cow has been discriminated from other animals that have common qualities. This is called abstraction. Abstraction is a process of isolating a certain characteristic of an object and disregarding all other characteristics of the same object at the moment. When you say that your uncle is fat, you isolate this characteristic of your uncle from other characteristics. The adjective 'fat' indicates his characteristic and also other persons'.

Again in the case of cow, when it is assigned with a particular word label it is called abstracting and when the word label is consistently applied only to the cow the concept has been learned.

But, generalization in the beginning is very crude. A little boy on seeing a horse for the first time might call it a cow or a donkey if he has already learned little of the concepts of cow and donkey. The new animal is related to the old in some manner. But when he comes to know that it is not the same animal that he saw earlier he is ready to learn the new name and differentiate it from the other.

I. S. Vigotsky had developed a test to study the ability to think conceptually. This test is very widely used in psychological studies. The test consists of twenty-two wooden pieces of different sizes, heights and colours The wooden pieces are spread out roughly into a circle and the subject is asked to arrange them into four groups



Fig. 4.1. Thinking: Concept Formation Experiment

on the basis of a principle that he finds suitable. The scores of the performance is based on the number of trials given to the subject and the time taken by the subject to arrive at a solution. (Fig. 4.1).

There are three kinds of concepts. They are conjunctive concepts, disjunctive concepts and rational concepts. The conjunctive concepts classify all objects, persons and events that have one common characteristic.

The concepts that include several characteristics are called disjunctive concepts. For example, when you apply for some job the management may consider your application either on the basis of your grade or athletic achievement or letters of recommendations. Either one of these or a combination of these will put you into the category of qualified candidate to the post.

The rational concepts refer to comparative characteristics. For example, there are three lights illuminating a place. First is bright, the second is brighter and the third is the brightest. We may attribute the characteristics of the second light as brighter than the first. Similarly the concept of heavy is meaningless without something lighter. (Fig. 4.2).

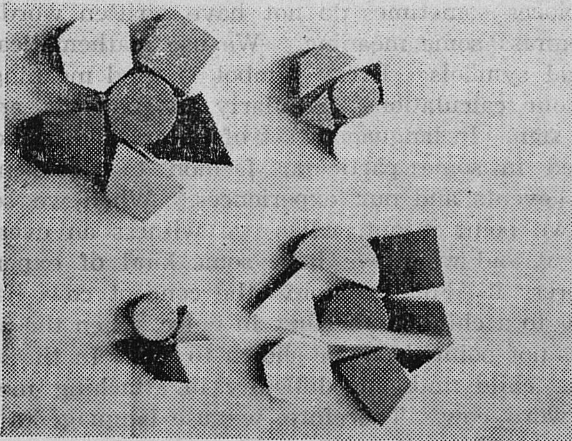


Fig. 4.2. Thinking: Concept Formation Completed Form

Language: Language is one of the important tools of thought. Human thoughts are mostly controlled by

language. Thoughts cannot be expressed without language nor communications are possible among human beings. Language is a sound phenomena in the evolutionary process of the species and human beings. It is having both direct and indirect influence upon the behaviour of others. You can command verbally a dog or a horse or an elephant. You can make a person to have painful feeling by a verbal shaft. This is how language is having indirect communication. In the beginning of human verbal learning the social aspects of language play an important role.

The function of language in thought process cannot be examined without any reference to signs. Signs represent the objects and events of the world. There are two kinds of signs, one the linguistics and the other non-linguistics. Waving the hands, nodding the head, raising the eye-brow—all these signs express some meaning. We could see sign posts, traffic posts in various places like road diversions, check posts, cross roads and in electric posts with a skull and two bones. Sign boards in all these places sometimes do not have written words, yet they express some meaning. We use mathematical and statistical symbols. Every symbol is used meaningfully in all our calculations. Similarly language is another kind of sign. In language a set of letters and sounds are combined in some particular fashion to represent the objects, events and our experiences. When we see an object we point it out, when we witness an event we explain it and when we have some kind of experience we express it. For example, the concept cow has no meaning to a child in the first instance, when the animal cow was not pointed out or shown to him. In the second time the child finds no difficulty in attaching meaning to the word cow. Therefore, we use language to point out objects when they were not present.

Language as a tool of thought is structured by certain formal rules. It is the subject matter of linguists to study the rules of language. The subject matters we

have stated here are having certain inter-connections between language and thought. When the psychologists and the linguists wanted to understand these inter-connections a new field of study called psycholinguistics was born. Psycholinguistics analyse language into its basic components and the basic components can be put up into complex structures. The psycholinguists use linguistic principles to understand the ways in which people use, generate and comprehend language.

A language may have several components. The simplest component or unit of language is the phoneme. This is basic speech sound and deals with rules of language sound. Phonetics is the study of sounds made in speech. In English language there are 46 possible sounds or phonemes. Phonemes are combined and made into morphemes. All words are morphemes, but all morphemes are not words. The morphemes are the smallest meaningful unit of speech. A meaningful word may have more than one morphemes.

For example, the word 'fruit-sellers' has four morphemes. The noun in these morphemes is 'fruit' and the verb is 'sell'. These two are called free morphemes. They are independent words, could express the meaning without any combination of any other morphemes. But the morphemes 'er' and 's' cannot express the meaning independently and they are called bound morphemes. The bound morphemes always appear connected with other morphemes. In this way free morphemes in combination with other free morphemes and with bound morphemes make words in any language.

The third component is the syntax. It is the study of grammar. Syntax studies the rules for combining words and morphemes into phrases and sentences. In the communication of any thought or language the sounds of phonemes, the place of morphemes and the rule of syntax play an important part.

Another aspect of language is semantics. It is the study of the meaning of a language. Semantics mainly deals with the formal structure and the emotion of language employed in its use. In a particular context it depends on how an expression sounds and looks. For example, the phrase 'good morning' may be expressed in sounds in different contexts with different persons.

The meaning of a word and its various associations among them and various possible occurrences constitute the structure of language. How extensively a language is used depends upon the structure of language. There are two kinds of meaning in a language. The first is the extensional meaning and the second is intensional meaning. The extensional meaning stands for the object. A word points out the object. For example, we may ask a question, 'what is a cat?' The answer to this question can be by pointing out to a cat, 'It is a cat'. The animal 'cat' is an external reference of the word cat. Children in every culture learn new words in this way.

The animal 'cat' can be pointed out in another way. This is by describing the cat with words like this: 'The cat is a little animal, with four legs and tail, found in homes, walking very softly, producing sounds like "mia" "mia". Any one who has not seen a cat can identify a cat with such description. This kind of meaning expressed by verbal description of words is called intensional meaning. The intensional meaning of a word may vary from person to person.

RATIONAL THINKING

When we speak something we mean that something should make some sense or meaning. When it is not, we say, it is not logical or does not make any meaning. When we expect that something we speak to be logical we are expected to follow certain principles or rules. Therefore, logical thinking is a way of thinking in which the rules of reasoning are to be properly followed.

At the higher logical thinking these rules are highly complex and rigid. There are several kinds of logical thinking distinguished by logicians. In every day life we are using several kinds of logical thinking even without learning the formal logic.

For example, you are waiting for a train in the railway station platform with your friend. If you hear the sound of the railway bell then at once you tell your friend that "the train is going to come soon". He also nods his head as a sign of approval of your statements. You have applied a logic here. You need not go through all the steps, explaining to your friend the cause and effect of the sound of the bell and the arriving of the train that whenever the railway bell rings the train would come. When both of you are implicitly agreeing these two ideas there are logical steps between the two ideas, "the bell is ringing" and "the train is going to come soon." We use such kind of logical reasoning in our every day life. But, when you move from every day logic to formal logic to prove the truth you will have to follow the rules systematically. In a formal logic we will have to use syllogism.

The syllogism is the basis of formal logic. The syllogism is a sequence of sentences in which a major premise and a minor premise lead to a conclusion. It is a classic device for clarifying thinking. The semantics has been developed as a supplementary technique by modern researchers. In a syllogism there are two sentences. They are called premises. One is the major premise and other is the minor premise. These two are put together in such a way that a third statement called conclusion is inferred.

Let us illustrate the point with a wellknown correct syllogism.

All men are mortal (Major premise).
Socrates is a man (Minor premise).

Therefore, Socrates is mortal (Conclusion).

Another example:

All Anglo-Saxons are beautiful.

All English are Anglo-Saxons.

Therefore, the English are beautiful.

But sometimes syllogism may be stated falsely if logical principle is not followed. The object of the minor premise should be the subject of the major premise and the subject of the conclusion should be the subject of the minor premise and the object of the conclusion should be the object of the major premise. (Fig. 4.3).

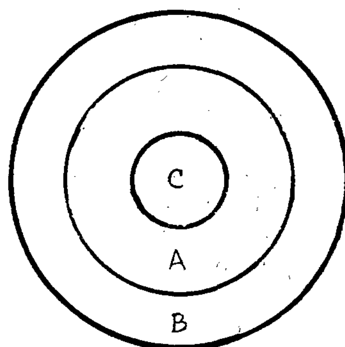


Fig. 4.3. Thinking: Rational Thinking

Here is a faulty conclusion based on faulty premise:

All A is B
All C is B
Therefore all C is A.

This syllogism appears to be correct. But it is not correct. Because the rule is not followed. Let us apply the rule and set it right.

All A is B (Major)
All C is A (Minor)
Therefore all C is B (Conclusion).

PROBLEM SOLVING

So far we have been discussing about logical thinking. It is one of the methods of solving problems. In our every day situation we may have more complex problems to solve.

Problem solving is a goal directed activity. It may be defined as a goal directed, multiple trial — and — chief approach to new situations and learning task, in which the individual discovers new modes of response.

For example, let us consider this problem. Here is a three digit number 999. Handle this number in whatever possible manner you like and make it 10. How do you solve this problem? The problem appears to be simple, but the method of solving it is difficult. A common reaction to this problem is, to make it into suitable components that should constitute into 10. The problem and the behaviour required for solving it would reveal some of the basic characteristics of problem solving behaviour.

The first thing in problem solving is that the correct response is not made immediately. If this takes place, then there is no problem. Therefore, there is a psychological gap between the problem and its solution. The gap can be filled up only by discovering the correct response to the problem.

The second thing is, that problem solving behaviour in human being mainly consists of covert responses. For example, in the case of the problem given here you may be trying to solve the problem in various ways talking to yourself. But nobody knows what method you are using till you make some overt responses either by speaking it out or by writing the solution on a paper. This would reveal your problem solving method to others. In this way, most of the processes in problem solving method are not exposed.

The third thing in problem solving is that the correct solution to the problem sometimes occurs suddenly without much efforts. We sometimes solve the problems by sudden insight. For example, the author, when he encountered the problem given here, tried to solve it in several possible ways by manipulating the three nines. Suddenly the idea struck in his mind that what is required here is to add one to nine to make the number 10. How to get one from the rest of the two nines. It is only by dividing one nine by another nine and adding it to one nine.

That is: $9 + 9/9 = 9 + 1 = 10.$

Steps in problem solving: Problem solving involves several basic psychological processes such as learning, preception, motivation and sensation. It is not a unity process and no independent theory of problem solving can be evolved. Therefore, we must understand the behaviour involved in problem solving. Problem solving behaviour occurs in four stages. They are (1) preparation, (2) incubation, (3) illumination and (4) verification.

The first stage is preparation. During this period the person who solves the problem acquires the necessary basic skills for solving the problem and becomes aware of the particular problem and makes himself ready to face the problem. The second stage sets in when he finds that all his efforts to solve the problem were useless. He stops at this stage for the time being and engages himself in some other kind of work. He may even forget that he left a problem unsolved. This period is called incubation.

But when the person keeps himself engaged in some other kind of task he may have sudden insight into the solution which he left unsolved. Now the answer is quite clear to him. This period is called illumination. It is often thought that incubation leads to illumination

and illumination need not be thought as an accidental phenomenon. It is rooted in the past experience of the problem solver.

It often occurs in the case of some problem solvers that they do not check their solution after the period of illumination. But it is important to verify whether the method of solution really solves the problem. Therefore, the problem must be attended once again with the new method. This stage is called verification. All the four stages in the process of problem solving behaviour are taking place in our every day life in such a way that we do not easily distinguish them. Modern psychological studies try to distinguish them in these ways.

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Chapter 5

IMAGINATION

We have studied more elaborately about the various aspects of thinking in the previous chapter. All these subject matters can be brought under the heading of directed thinking — as they are aimed at solving a particular problem. This form of thinking is limited in its scope. There are also other forms of thinking which are unlimited in their scope. They are called associative thinking. In a word it can be stated as imagination. Fantasies, daydreams and dreams are of this type of thinking. All these are unlimited in their scope as they are not directed to solve any problem.

WHAT IS IMAGINATION ?

Imagination may be defined as an act of forming a mental concept of what is not actually present to the senses. It is also stated as the manipulation of images. An image is an artificial imitation or representation of the external form of any object.

An image is a collection or reconstruction of a sense experience, often visual. The important process that takes place in imagination is the rearrangement of the materials we have experienced in the past in relation to the present. The result of the arrangement is sometimes based on recency, frequency and vividness of our experiences. A recently perceived object can be combined with a similar object perceived in the past. This combination need not be real or in existence. In our imagination we combine several of our past and present experiences in a new or in a peculiar fashion. We wish to see something new out of the old objects. We don't

care whether such combinations are possible in the world or not.

For example, Chimera is a fanciful animal with a lion's head, a goat's body and a serpant's tail. In Greek mythology the animal Chimera is often spoken of. It is not real, nor existed at any time in the world. It existed only in human imagination. Some one wished to see such a creature and he had created it in his imagination. Similarly, you can imagine a mermaid, combining a beautiful woman and a fish. A mermaid is an imagined creature in which a half of woman's body and a half of fish's body are combined. This idea may often arise in your mind, because your poets and novelists often present your reading materials, comparing women's eyes to fishes. You may also find certain amount of similarity between these two. Adolescent boys and girls have fantastic imaginations.

Children are highly imaginative. Every element of imagination is related to the child's experience. Children's imaginations may lack organization. They often have companions in their imaginations. Such imaginations express that children have needs and when their needs are not fulfilled they imagine companions and find comforts. Both in children and adults the main causes of imagination would be the inner world of needs, worries and preoccupations with outer world of sensory stimulation.

Imagination and memory: Imagination is a way of presenting something to ourselves that has not existed previously and can never exist whereas memory is a way of presenting to ourselves something without any change or modification, that has been learned or experienced earlier. Therefore, imagination is different from memory. Imagination may vary from memory in degree to which changes or rearrangement are made in the original materials. The characteristics of imagination depend upon the materials experienced and retained by

the person from the past. But, what is new is the rearrangement of different materials in a particular fashion. The elements of imagination are old, but the combination of the materials presented is completely new. In memory you are bringing back the materials which you have learned earlier without any change. If you make any change or modification in the materials it becomes imagination.

Many materials are true. They are experienced and presented to yourself as they are experienced by you. For example, in imagination a man with spectacles may be imagined with a horse's head and a human body, but in memory he is seen wearing spectacles. Imagination is private and subjective whereas memory is objective. For example, a material is presented visually to four persons. All the four persons may imagine four different things from the same material. But the same four persons, if their memory is accurate they will present the same subject matter.

It is very difficult to explain to blind men how an elephant would look like. You know the story of four blind men and an elephant. How fantastically they have imagined about an elephant? Therefore, it is possible to have fantastic imaginations from the verbal instructions one has received without any visual perception. Gardner Murphy observed that when the elements of imagination are combined in new ways by the application of the laws of association the same laws operate also in the case of memory. But with all that, the laws of association relating to memory are differently dealt with in imagination. Therefore, the study of imagination differs from the study of memory.

How to study imagination ?: Psychologists tried to study imagination scientifically. The role of drives has been used in this study. Persons subjected to prolonged

hunger often speak of rich feasts of which they dream. Persons put into more physical discomforts often dream of health and bodily pleasures.

Our imagination, sometimes is utterly free and uncontrolled. Our thoughts may run very wildly and fantastically. Nothing can prevent them. All our day dreàms or fantasies are free imaginations. Though in our imagination our ideas run riotously there is a method in it. A set is operating in it. The role of drives may be used to study the imagination.

It is not only visceral drives but also activity drives which play an important role in the day dreams. If you are interested in some kind of play and if you are deprived of it you indulge yourself in day dreaming of the play. Our sensory drives for seeing and hearing also guide our imagination. You may have a strong desire to see and enjoy a beautiful garden or to hear and enjoy a sweet music. When there is no chance for this you imagine about the one you have enjoyed in the past. So also the same drive would make you to aspire for power and prestige and you make great achievement in your imagination. The sex urges carry everyone into the world of imagination where he finds his desires are satisfied.

The process of imagination can be studied at close range by the method of chain association test. According to this method we present a single word to the subject and allow him to give us a chain of words associated with the word. By this means the subject uses each word he utters as a clue for the next word. For example, one may get a chain of words like this: Boy-girl-marriage-father-mother-family-prayer-temple-God-religion. The subject may stop for a moment at some word not knowing what to say and himself does not know that he is stopping because there may be mental blockage. This is called

interference and psychologists are interested in such interferences. It reveals the preoccupations of the individual.

A child may be asked to tell a story of a bird, or an animal or a human being. A picture also may be shown to him to make a story of it. We can find relationships between his imagination and events of his life. Such stories reveal the subjects desires, worries and their preoccupations which they hesitate to reveal in ordinary face to face situations. The story events may reveal even the materials they have stored in their unconscious mind. C. D. Morgan and H. Murray (1930) have developed the Thematic Apperception Test. This test serves several purposes. It consists of a series of standardised pictures of one or more human figures in different poses. The subject is shown the pictures one by one and he is to make a story for each picture. This test would reveal the differences in predominant interests and worries of the persons on whom it was administered. The subject may make up a free story.

Daydreams: In human beings there is going on a kind of activity, called ideational activity which has nothing to do with the present environment. According to R. S. Woodworth ideation is a mental activity or having ideas. In this activity there is neither muscular movement nor sensory stimuli present. You may be reading a new novel and may be absorbed in it as you find it very interesting. Every event or stimulus you come across in the pages of the book represents imaginary events or stimulus. They have nothing to do with your surroundings. At some point you may even stop reading the novel and relate those events, objects and persons to your own past and present experiences. You may recall both pleasant and painful experiences of your life and others and try to continue the life events further in the manner in which you are interested. Hence you begin to live in an inner world of your own which

is free from the real world. This kind of mental activity is called daydream. Daydream is a kind of imagination in waking state.

Daydreams, reverie and fantasy all generally refer to same mental process. Daydreams and fantasies are used synonymously sometimes. Fantasy is the general term used to indicate free imagination. Fantasy in a highly developed form is called daydream. It is the result of forming representations of things not actually present. Daydream is a reverie. All the poetic materials are the results of daydreaming.

In daydreams you exclude external stimuli for the moment. At the time of sitting in the class room and listening to the teacher your mind may be wandering somewhere else on hearing some familiar song broadcasted from a distant place. Or while you are listening to a story told by your teacher you might have immediately gone into a daydream and associate it with the events of a story told by your grand-mother or with a story of a movie that you have seen in a picture house a few days ago. For a moment you forget what the real world is demanding of you and do something else. You relax your mind and you allow your ideas to wander freely. In this process one idea drags another idea and one memory recalls another and a chain-like process is taking place. In this process of free association, if you review your thoughts and experiences in a sequential manner long forgotten life events are also recalled. Here your throughts are not controlled and directed towards any specific purpose. You are manipulating your ideas in whatever manner you wanted. Walls, iron bars, seas and oceans cannot prevent them. You can fly in the air, live under the sea, build castle in the air and live there.

Daydreams occur frequently among children and more frequently among adolescents. When children are

prevented from eating sweat-meat or playing with toys and weapons they find them in plenty in their day-dreams. Sex starved youths gratify their desires in their daydreams. In daydreams a person achieves all those things that he cannot achieve in his real life. There is continuity of thought in daydreams and the thoughts are going on working out various themes in which the person plays the central role. In this kind of free imagination a man's long cherished hopes and desires are fulfilled. He sees himself always engaged in heroic activities and making great success. He defeats his enemies, wins the first prize of five lakhs of rupees in the Lottery, wins the heart of the most beautiful girl, passes in the examination in the first class with a first rank, exhibits unchallenging ability of some kind. He wishes to play always the role of a conquering hero. But, sometimes a person's day dreams may lead to unresolved conflicts and he imagines all sorts of disappointments and worries and he plays the role of a suffering hero. He becomes unpopular among his friends and not respected by them, loses good fortunes in the race or lottery, meets with heavy loss in business. His girl friend disappoints him after giving hopes.

All these materials of the day dreams come from our every day experiences. Day dreams usually serve the purpose of wish fulfilment. There is always a plot in a day dream. It has continuity. Man can escape from difficulties and responsibilities of his real life for few minutes. It is also a kind of indoor game and he finds some kind of pleasure in it. But if the day dreaming goes to the extreme level it leads to several kinds of maladjustments. The person may be often playing the role of both the heroes and lose all contacts with the real world. Finally, he may develop delusions and persecutions.

Dreams: Dreams were considered as mysterious matters until the early twentieth century when Sigmund Freud has published his famous work, "The Inter-

pretation of Dreams". Dreams are regarded as a kind of personal experience man gets during his sleep. It is also a kind of imagination that goes on when one is asleep. Sleep is a state, generally, contrasted with the waking state. In the state of sleep there is a great amount of reduction of awareness and activity. Biologists are of the view that sleep is a restroactive state. A person may choose either to sleep or to be awake. There are borderline stages between sleeping and waking states.

Dreams are considered as the private property of the individual. For a long time it is considered that dreams cannot be observed objectively and measured. But experimental psychologists have studied the dream experiences. According to them dream may be defined as the appearance of rapid eye movements on the electro oculogram (EOG) of a sleeping subject. Electro oculogram is a graphic record of eye movements obtained at locations around the eyes. It seems that the eye movements are reliable indicators of some type of thought process in subjects who are awake and who are asleep. This is an operational definition based upon experimental studies.

In the dream state the activities of the brain are reduced to a low level. There is no contact with the environment. But some stimuli may be having some kind of influence upon the organism which is most of unnatural manner. For example, a feeble tapping of some metal may be taken for a thunder storm, the sound of an alarm time piece for the play of a musical instrument and so on. Dreams do not have plots or sequences. The dreamer may find the events of the dreams are real at the moment and he may wish to continue it if it is a pleasant dream.

The dream is a kind of thought process often characterised by vivid sensory images mainly visual and

auditory. Dream is associated with brain wave that is accompanied by rapid vertical and horizontal eye movements. There is correlation between eye movement and the dream content. The eyes are moving when there is a dream. In the waking state our eyes are moving in relation to the object. Similarly our eyes are moving when we watch an event or object or person in the dream. Dement and Wolpert (1958) studied various aspects of dreams experimentally. According to Dement there are four periods of dreaming in seven hours time. The first period lasts for ten minutes and begins within an hour after the onset of sleep. The other periods may be lasting for an hour with an interval of about hundred minutes among them. Generally the third and the fourth periods seem to be longer than the first and the second periods. According to recent researches animals like monkeys, dogs and cats also have dreams of simpler type.

Every normal person must have dreams every night during sleep. A normal person in his twenties spends about twenty per cent of his night in dreaming. It is an important psychobiological function and any suppression of dreaming may cause serious mental disturbances. Persons who suffer from mental illness like acute paranoid, psychosis spend about fiftynine per cent of their total sleeping time in dreaming. Dream is a kind of hallucination. According to Sigmund Freud (1856-1939) dreams are the guardians of our sleep.

There are three important causes for our dreams: They are (1) wish fulfillment, (2) mastery impulse and (3) physiological discomforts.

1. Most of our dreams are wish fulfillment. Children often dream of things that are desired by them. Starving people often dream of eating feasts. Sex craved people often dream of fulfilling their sex desires. Explorers of Arctic regions dream of warm weather and green fields. The thirsty man dreams of drinking gal-

lons of water. The desires and physiological needs that are not fulfilled in the real life are fulfilled in the dream life.

2. Several causes have been stated by psychologists for the dreams. Apart from the wish fulfilment, the mastery impulse also plays as one of the causes of dreams. Man's desire for dominence over others becomes active in dream. The servant who is teased by his master every day dreams of teasing his master one day by saying 'shut up'.

3. The man who sleeps by putting a heavy blanket over his feet dreams of getting into the hands of his enemies as his feet were tied together and was not able to run and escape. The physiological disturbance the person was experiencing during the sleep has become the cause of such dream.

Types of Imagination: There are two types of imagination. They are reproductive imagination or memory and productive or constructive imagination. When our imagination simply reproduces our past experience without making any change in it, it is called reproductive imagination. The process of reproductive imagination is the same as the process of memory. In the productive imagination our past experience is completely rearranged in a different fashion by adding something new. All our scientific inventions and discoveries, buildings and dams, plays and novels, painting and sculptures are the results of productive or constructive imaginations.

KINDS OF IMAGES

What is an image?: We acquire knowledge of the world through the processes of sensation and perception. We acquire knowledge also through the process of imagination and the formation of images. We have

studied more elaborately about imagination. We must know that imagination is not possible without the formation of images and the formation of images is not possible without keen sensitivity to objects, places, persons and events. We see often objects, places and persons and witness events and hear voices. After few minutes or hours or days we would like to know them. What we had was only sensory experiences and now we like to recollect those sensory experiences by forming a picture of those objects in the absence of those objects. This is called mental image. Mental image is a process of visualization of our past experience in the form of an object. An image may be also defined as an artificial representation of the external form of any object. It is a mental picture or impression of something.

Imagery refers to mental images collectively or generally. A series of mental images may be called imagery. In this way we have visual image, auditory image, olfactory image, gustatory image and tactual image. For example, the auditory and tactual imagery are dominent in a blind man. A man can never have any mental image without sensory experience.

Images may be classified as memory images, after images and eidetic images.

Memory Images: When we perceive some object, person or event we do not completely discord it from our memory. We have the capacity to trace it and restate our past experience in the form of an image after sometime. This image may be clear sometimes and sometimes may not be. There may be vague impressions. Some people may have vivid, sharp and definite picture of the object like photographs. People's images differ markedly. Because two people do not see the same object or event in the same manner and they give different account of it. What kind of image each one had of the object or event depends upon several factors like past experience,

motivation and learning. Each one uses language to describe the image he forms of an object. This verbal description of the image he formed is not the same as that of the other. Therefore, the two images vary from each other and thereby the images vary from the object. All the mental images are the memory images.

After Images: After image is a kind of image, formed in a person after the disappearance of the object. We know that when our eyes are exposed to a bright light for a few seconds and immediately experience a short dark interval the resulting sensation is the persistance of the stimulus with less brightness. This is called positive after image. This image is short lived. The positive after image is a reproduction of the original sensation after the disappearance of the stimulus. Therefore, an after image may be defined as the sense experience that occurs after the stimulus had ceased to exist. Several psychologists like Swindle, Galton, Binet and Terman have conducted experiments to study after-images. Persons who have recurrent after images report of ghosts and apparitions.

Sir Francis Galton (1822-1911) was the first to conduct experiments on this. He had collected data on frequency and vividness of imagery. His studies dealt with memory images and not after images. Memory images depend upon voluntary recall. The after image does not depend upon any effort to recall it. But, however we differentiate these two, the memory image has the same basis as the after image.

In Galton's study the subjects were asked to recall the appearance of 'this morning break-fast table' to collect data about the 'pictures in the mind's eye'. He has designed a scale to measure the degree of vividness of the image. He has given zero mark for no image and 5 for an image which had equal clarity to the original object. The results had a very wide range. It was a great surprise to Galton that some had no imagery at all

while the others had as vivid images as hallucinations. In Galton's study and in other studies it was observed that visual imagery was very vivid and most common. Other imagery like auditory, tactile, kinesthetic, gustatory and olfactory were in this order and approximate. It was also found that those who were high in one type of imagery also found high in other types. People who were in jobs of abstract thinking had their images below the average.

In Binet's (1857-1911) study it was found that musicians who dealt with rhythms had more vivid auditory images than the psychologists had. Variations in imagery have been observed in people. Children have more vivid imagery than adults. Concrete objects produce better vivid imagery than abstract ideas. But the vividness of the imagery considerably deteriorates when we deal with abstract ideas and meaning. People engaged in routine activities have poor imagery about their performances. But the same persons when engaged in new kind of activities have better imagery.

It has been observed in the studies of thinking and problem solving that images are likely to occur more if there is any blockage in the flow of thought. The problem-solver has more imagery when he finds himself struck up and unable to proceed further. One may find more imagery when he goes to sleep.

These observations seem to suggest that training, interest and motivation may have some influence upon imagery. Training appears to improve the quality of imagery and motivation seems to influence the content and intensity of imagery. Terman cites a case of a boy. The boy was very much interested in music and he was strongly motivated to become a musician. He was practising music for a long time to improve his auditory imagery and he was very much successful. But it was also found that the training had no effect if there was no interest and strong inner motivation.

In one of the studies made in the University of Minnesotta on starvation the subjects often reported thoughts of food and their imagery for foodstuff was more vivid than normal human beings. Studies in the clinical field show that men who have strong sex drives have more visions of women and images of sexual embraces. Imagery may be simple and exact copy of one's past experience. They are modified in various ways according to the conditions of the whole organism.

Eidetic Images: In the previous section we have read that there are variations in the imagery. Some persons, particularly children have better image than the adults. But human beings on the whole have the capacity for developing images which may be quite similar to photographs. These images are called eidetic images. Persons who are having such experiences are called eidetics.

An eidetic imagery has unusual clarity and vividness in character. A person with eidetic imagery is said to have a 'photographic memory'. Therefore, an eidetic imagery may be defined as an unsually sharp and detailed visual representation of something that has been seen.

This something may be a picture, or a sculpture, or a scene or a page of text. It enables a person to describe the features of an image in minute details. It has been observed that children between ten to fifteen years of age seem to show eidetic imagery frequently.

Psychologists have been showing much interest in the study of eidetic imagery. It is closely related to both after images and to the actual percepts. The word percept refers to the object to be perceived. Meenes and Morton (1936) jointly and independently studied the eidetics and non-eidetics. Meenes and Morton have compared the after-images of the two groups one the eidetics and the other non-eidetics. It was observed that the after images of the eidetics were superior to the non-

eidetics in several respects. The images were aroused at once, remained for longer duration, more positive and with more details in the case of eidetics whereas in the case of non-eidetics they were not. After a week's time the eidetics were found to be again superior to the non-eidetics in their ability in reproducing and reporting their images with details.

A recent study in this line has been made by Haber (1969). He has discovered 20 school children out of 500 with eidetic imagery. Every child was asked to look at a picture part by part for 30 seconds. Then the picture was removed and the child was asked to look at the blank frame of the picture and report what he saw in the picture. The children required 3 to 5 seconds to look at the picture closely to produce an image of the picture even though it was familiar to them. The images fade away after describing the picture. They could not prolong the images and report them. They could erase the images by looking away from the blank frame of the picture. There was individual differences in the quality of eidetic imagery. Haber has observed this in his study.

One of the girls served as a subject in Haber's study was able to move and reverse images and could reproduce them after several weeks of the study. Further, three children were able to produce the eidetic images of three dimensional objects. Some children were able to form a new combination of the picture by superimposing the eidetic image of one picture into another. But one interesting result in this study is that the eidetic children were found no way better than the non-eidetic children in memory tests. Eidetic images can be modified by voluntary effort. The two studies made by the authors seem to differ in their results. This shows that there may be several factors that determine the eidetic images of the individuals. Further studies on this phenomenon may provide us with much better knowledge.

Associated Imagery: We have been mainly looking into visual type of imagery. Imagery may be visual or

auditory type. It is also possible to have imagery of every sensory experience. But it is also likely that every image may be associated with every other image with the same modality and also with the image of other sense organs. It is easy to associate the visual and the auditory images of an object. For example, if you are asked to form the image of a musical instrument, the violin, first you may have the visual image of the instrument — the physical appearance and secondly the auditory image of the instrument. You might have witnessed a performance in which a famous violinist might have made you to form the image of this instrument the moment you hear the name of it. Those two images may be aroused more promptly.

A mental picture of a delicious dish like a chicken roast or a sweet meat like jankery is followed by gustatory experiences. Here the visual image is associated with taste image. There are incidents in which three images like visual, gustatory and olfactory may be associated. A skillful cook may prepare a delicious dish for a dinner colourfully combining it with palatable taste and pleasant smell. A person who ate such dinner might have formed all the three images when he had the occasion to remember the dinner.

Therefore, we could see that it is only the sensory experiences that are arousing images of various kinds. Experimental evidences show that one sensation may arouse an image of another sensation. This may take place as a result of conditioning. If you have learned to associate a good taste of a dinner with a pleasant smell, the very smell of it even without seeing the food would arouse the image of the food and taste. In this case you have been conditioned to the smell and the smell arouses the image of the food and taste. In learning experiments of various kinds shocks are introduced. Students who serve as subjects in such experiments often hallucinate to shocks even when shocks are not administered in certain learning experiments. With regard to vision and

hearing this kind of association between sensory modalities is quite common. There are people who could translate the sounds heard by into visual pictures. A sweet song heard in a radio programme could arouse the image of the person who had sung the song. Some people have the tendency to associate colour with musical notes. This kind of tendency is present in every culture for a long time. But, what colour is to be associated with a particular musical note requires elaborate studies. These kinds of associations are called cross-modality associations.

Psychologists have shown special interest in this kind of phenomenon. They want to build up special terminology in this area. Synesthesia and chromesthesia are the two important terms they use to indicate the cross-modality associations. Synesthesia is a general term used to indicate the form imagery in which a person experiences one sense in terms of another. Synesthesia refers to the vivid image aroused by a stimulus of one sense in a different sense modality. Chromesthesia refers to the occurrence of the image of colour in association with non-visual stimulus. In this state colour is seen when sounds are heard. Chromesthesia is also called colour hearing. Among these two forms of imagery synesthesia is widely found among children and they are also called eidetics. People with colour hearing often associate high tones with bright colours and low tones with darker shades. Some psychologists are of the view that creative artists have synesthesia to a greater extent than the average. It is assumed that the artistic mind is having greater familiarity in arranging these sensory experiences.

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Chapter 6

EMOTIONS

The ancient philosophers have ignored one of the most important problems of modern psychology because of their extreme love for matters of intellect. This problem is that of psychodynamics. Psychodynamics are the basic sources of power behind human behaviour. What impels man to behave as he does? Why does one person work harder than the other? You may find answers to these types of questions in the psychodynamics of human behaviour. You may find explanations to these questions in terms of hunger, thirst, love, anger, fear, anxiety, ambition, joy, jealousy and similar powerful human motives. The simplest dynamic factors arise from the nature of man's biological structure. There are certain constant biological states which must be kept uniform if the organism is to survive. The organism must be constantly supplied with food, water, oxygen and other things. The organism mobilises energy and puts forth vigorous efforts to maintain these constant states for survival.

Much of human activity is directed to the achievement of goals. But what are the other dynamic factors that are mobilizing energy? They are emotions such as fear, anger, love, hate, joy, surprise, jealousy and the like, personal motives such as ambition, prestige, power, self expression and social values such as religion, search for knowledge. Modern psychologists treat emotions as a kind of motives and so they deal with these two concepts in the same topic. Recent authors reinterpret emotion in terms of activation and arousal.

Activation refers to general body tension or arousal. It enables body to move and act. It is very difficult to study the cause and effect. Because it deals with complex set of internal physiological changes. The pattern and degree of activations are primarily responsible for the feelings and emotions that play a very great role in our daily life.

According to activation theory, emotion is a state of general excitation. Activation occurs whenever physiological factors activate a motivated response. The stronger the internal need or incentive the greater the degree of activation. The more desire one has for a job the greater the degree of tension a person develops. Therefore, different form of motivation produces different pattern and degree of activation. For example, a painful stimulus may produce one pattern of activation called fear. A frustrating situation may produce another pattern of activation called anger. A sex-related motive may produce a pattern of activation called love. Therefore, the primary basic biological drives make the organism to move and act to satisfy the needs and maintain the constant biological states for survival. The second type of dynamic factor are energy mobilizing processes. They are emotions such as fear, anger, love, hate, joy and jealousy. Activation is essential to most motivated behaviour in complex organisms. Activation not only releases physical energy for activity but also it produces the feelings which we call emotions.

NATURE OF EMOTION

We can understand from the introduction given above that modern psychologists treat emotions as motives since emotions show all the characteristics of motivated behaviour. Recent researchers interpret emotions in terms of activation. They are of the view that activation in varying degrees produce different patterns of emotions and therefore variety of feelings accompany activation.

Emotions such as anger, fear, love, hate, joy, jealousy, worry and all their variations are becoming a part of our daily life. Our conversations are not complete and interesting if they are not loaded with some of these emotions. Poets, novelists and artists could not present their subject matters in their works without love and hate, anger and fear, and joy and jealousy. What do we mean by love and hate or anger and fear? It is very difficult to define and describe an emotion, because the characteristics of an emotion is not found in the same manner in everybody. It varies from person to person and from situation to situation.

For example, a smile is the indication of friendship. It expresses a pleasant feeling. This is the general opinion held by people. But, it is also an expression of enemity, jealousy and hatred. Some people express their unpleasant emotions through their smiles. But psychologists try to study the nature and characteristics of emotion from real events of life and natural situations. Several definitions and characteristics of emotions have been brought out from such studies.

Emotion may be defined as a complex and conscious affective experience involving physiological changes and overt behaviour.

Emotions are the stirred up states of the organism. The stirred up states are expressed in some parts of the body like dilated eyes, twisted fist, pounding of heart and sweating.

It is also stated that emotion is a stirred up state of consciousness, masses of feeling and impulses. Emotion is not a local response, but a general response of the whole person. Therefore, the whole person, the whole body and the whole consciousness are involved together in the response. Emotion also involves imagination, memory, thinking and perception. Therefore, emotion may also be defined as the stirred up states or responses

of the bodily parts of the organism involving physiological changes that express in overt behaviour patterns. But on certain occasions most of us conceal our emotions to some extent. We do this to protect our self-respect and to confirm our social manners or conventions. In such situations certain clues help us to determine another man's emotions.

Emotions possess all the characteristics of motivated behaviour. Every emotion is a goal directed one. In the state of intense fear men are capable of feats of strength and endurance for escaping from dangers. They would be capable of the same even under normal circumstances. Anger motivates great amount of energy in an organism for combating against the enemy. In the case of hate, energy is motivated towards the destruction of the hated person.

Emotions vary in intensity. It may range from mild antagonism to extermination or destruction of the enemy. In the extreme emotional state the person may become panic and refuse to accept any reason or logic.

There is certain amount of persistence and variability in emotional behaviour. In specific emotions such as fear and love and in generalized emotions such as anxiety and worry we realize the persistence of tension and this forces the individual towards action and thus reduces the tension. In certain respects the strong emotions are having reaction in our physiological make up. For example, pounding of heart, stomach disorder, flushed face and the like are the physiological reactions. Usually in the case of emotions tension is aroused by outside stimulus or external situation. The outside pressure is applied on the individual and great amount of tension is collected in the striped muscles and stomach muscles. Some horrible noise, physical injury or some unpleasant thing may throw us completely out of balance. We are upset and enraged. We at once rush to avoid them. All these we call emotions. But emotions differ from person

to person in certain situations and time to time in the same person.

The duration of emotion is very short. It exists only for a short moment and then disappears. But during this short period it disturbs the equilibrium of the organism. If it exists for longer duration it may affect the mental health of the organism.

Emotions are not inherited. They are aroused by external stimuli and circumstances. Emotions are developed right from the childhood period.

PHYSICAL ASPECTS OF EMOTION

We have described certain common characteristics of emotion. Emotions are not related to a single bodily part. They involve a complex bodily pattern. In emotional state several physiological changes are taking place. All the visceral responses are a part of the

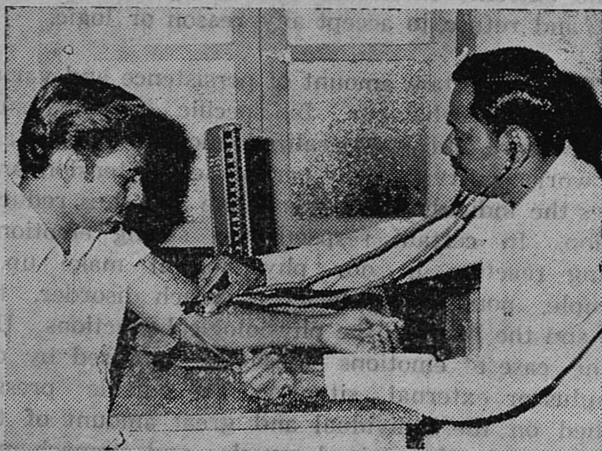


Fig: 6.1. Emotion: Sphygmomano Meter-Measuring Blood-Pressure

emotion. It is experienced by us that emotions are associated with flushing, pounding of the heart, paling, trembling, shaking, clinching the fist, grinding the teeth,

erection of hair (goose flesh) and so on. There is also change in blood pressure, heart rate, intestinal contraction and glandular secretions. All these changes are aroused by fear, anger, love, hate and similar states of emotions. Several researches have been conducted on physiology of emotional responses and found that the intensity of such bodily changes goes well with intensity of emotion felt by the subject. (Fig. 6.2).

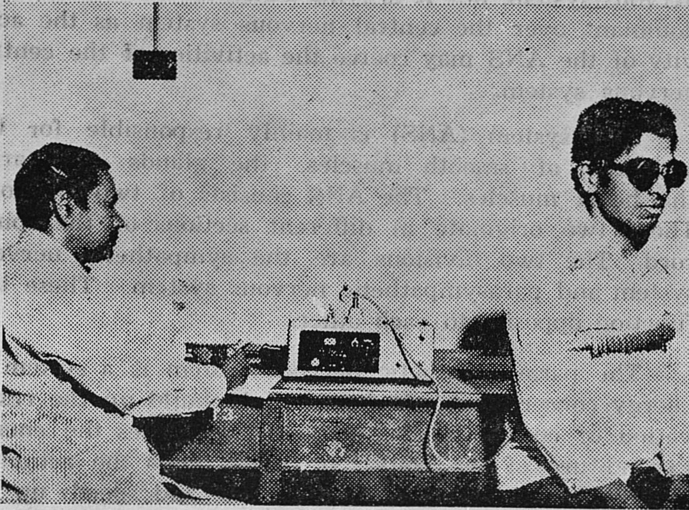


Fig. 6.2. Emotion: Polygraph-Measuring Emotional Reaction

The physiological changes that are associated with emotions are mainly controlled by the autonomic nervous system and the endocrine glands. Those two bodily systems are mainly responsible for the various symptoms that follow the emotional states.

All these changes are measurable responses to some extent. But the physiological changes that are associated with fear are different from those associated with anger and love. The emotional states of the body involve the interaction of many parts of the central and peripheral nervous system. The particular nervous system that

plays an important role is the autonomic nervous system (ANS).

The Autonomic Nervous System: It is so named because it is not under voluntary control. It is independent. The autonomic nervous system consists of bunches of nerve cells and nerve fibres connected with central nervous system, but it is lying outside. In a sense, it is dominant over the central nervous system as the activity of the ANS may coerce the activities of the central nervous system.

This system (ANS) is mainly responsible for the activation of smooth muscles, the glands and partly the heart muscles. The ANS consists of two divisions. These two originate in different sections of the spinal cord. The two divisions are the sympathetic nervous system and parasympathetic nervous system. These two function opposite to each other.

The parasympathetic nervous system is a system of energy conservation. It functions to build up the reservation of energy of the body and regulates the energy expenditure of the body. It shows down the action of the heart, reduces the breathing rate and speeds up the stomach and intestinal function in the digestive process and stores the glycogen. The glycogen is a carbohydrate that is converted into energy by the liver. In this way the parasympathetic nervous system is mainly concerned with these needs of the organism. It is concerned with nutrition, oxidation, elimination of wastages, growth of self-repair, hunger and sex. In otherwords it deals with vegetative activities and accelerates digestion.

The sympathetic nervous system on the other hand is a system of activation. It releases energy for immediate use of the body. It is specially active in emergency situations. It increases the speed of the heart and breathing, increases blood pressure, releases glycogen from the liver into the blood streams and converts glycogen into energy and forces the energy-rich blood into muscles

of arms and legs. It also slows down the digestive function of the body. The sympathetic nervous system is concerned with such emotional responses as fear and rage. It interferes with digestion and stimulates the adrenal glands. (Fig. 6.3).

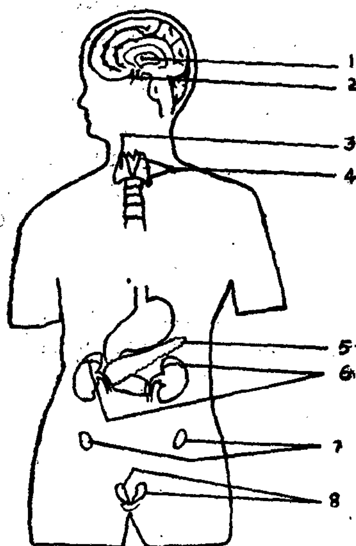


Fig. 6.3. Emotion : The Autonomic Nervous System

1. Pineal Gland	5. Pancreas
2. Pituitary Gland	6. Adrenals
3. Thyroid Gland	7. Ovaries (In Female)
4. Parathyroid Glands	8. Testes (In Male)

Since the sympathetic and parasympathetic systems function relatively independent of each other, different forms of activation may be dominant in each of these systems. For example, activation following hunger is likely to involve the parasympathetic (conservation) system to a great extent while activation following escape from danger is likely to involve the sympathetic (energy) system. The differences in emotional responses

are also due to the differences in the action of these two systems. But in the case of sexual organs there seems to be a simultaneous kind of nervous activity involving both the systems.

ENDOCRINE GLANDS

The autonomic nervous system plays an important part in controlling the endocrine glands and the duct glands. Since the glandular system is mainly responsible for the maintenance of the internal environment any interference by the autonomic nervous system affects the functions of the glandular system. In the emotional life of the organism an important role is played by the endocrine glands. Therefore, this becomes a special interest to the psychologists.

The glands are the specialized internal organs, which produce a kind of chemical substance necessary for the proper development and function of the body. The glands vary from single celled glands like the mucous glands of the nasal passages and sweat to a very complex glands like the pituitary gland. The glands are classified as duct glands and ductless glands. The substances secreted by the glands are called hormones. The ductless glands secrete the hormones directly into the blood streams. The ductless glands are known as endocrine glands. The figure shows the location of the important endocrine glands. The hormones secreted by these glands are carried out throughout the body. They either affect the body as a whole or excite or inhibit certain specific function of the body. Therefore, the effects of these endocrine glands are not local, but general. The effects reach the entire bodily parts. They influence all those tissues on which emotions and actions depend.

The endocrine glands are said to be bathing the whole nervous system including the brain with chemical juices. Men may react with different emotional responses to the same stimulus, because they may be chemically

different men. Therefore, the chemical juices of the glands of different levels produce different emotional responses in men. Changes in feelings and attitudes of human beings during childhood, adolescence, adulthood and old age are attributed to the different levels of hormones secreted by the endocrine glands. These glands influence the nervous system of the organism in such a way that it responds to different types of stimuli either quickly or slowly. Therefore, the glands of the internal secretion become the fundamental importance to the life of the human beings. The endocrine glands that are very important for our study are pituitary gland, thyroid gland, pancreas, gonads and adrenal glands.

The pituitary gland: This gland is often known as the master gland, because it produces the largest number of hormones and they are carried throughout the body and regulate the activities of other endocrine glands. It is located in the skull, beneath the brain and is connected to the hypothalamus. It is about the size of a corn. The malfunction of the pituitary gland causes marvellous physiological changes. The person may be four feet midget or an eight feet giant.

The pituitary gland consists of two parts. They are posterior pituitary and anterior pituitary. The posterior part of the pituitary gland is also known as neurohypophysis. It secretes two kinds of hormones, namely vasopressin and oxytocin. The water balance of the body is controlled by the posterior pituitary gland. The under secretion of the hormone in posterior pituitary causes diabetes, which excretes large amount of water from the body and also causes strong thirst. The effect of hyper or over secretion is not causing any defect.

The anterior pituitary is also known as adenohypophysics. This is the exact master gland. The anterior pituitary gland controls the adrenal cortex, the thyroid and the gonads. The important hormone secreted by this

gland is called the somatotropic hormone. It directly stimulates the normal growth of the body. The under-secretion of the hormone in anterior pituitary affects the growth greatly. It results in producing pituitary dwarfs or midgets with four feet tall. The over secretion of hormone in anterior pituitary produces pituitary giants with eight feet tall. Studies recently made suggest that hypersecretion in anterior pituitary causes diabetes in some individuals.

Thyroid gland: The thyroid gland is a large mass located on either side of the wind pipe. It produces a hormone called thyroxin. This hormone regulates the body's metabolic rates. This determines the rate of transformation of the food we eat into energy form. The amount of thyroxin produced by this gland causes difference in metabolic rates. Too little thyroxin makes a person to sleep too much. His body fails to maintain normal temperature. If it occurs in childhood it leads to a condition called cretinism. It results in inadequate bone growth, puffy face, pot belly and protruding tongue. Too much thyroxin increases metabolic rates. The person eats too much, but still he is feeling hungry. We are calling such people as gluttons.

Pancreas: The pancreas lies in between stomach and small intestine. It produces a hormone called enzymes into the small intestine to aid digestion of protein. It controls the level of sugar in the blood by secreting two kinds of hormones called insulin and glucagon. Too little insulin causes too much sugar in the blood. The kidney tries to get rid of the excess sugar by excreting more water than usual from the body. The tissues get dehydrated. Then the person becomes a diabatic patient. He needs insulin and sugar free diet to keep the blood sugar at normal level. But too much insulin causes too little sugar in the blood and the person suffers from chronic fatigue.

Gonads: The gonads are the sex glands. These are the reproductive organs in human beings. In males they are called testes and in females ovaries. The gonads function with adrenal glands in the development of reproductive organs. They also control the development of the appropriate secondary sex characteristics like the distribution of body fat, development of pubic hair, change of voice in males and development of breast in females and increased interest in the opposite sex. The male reproductive hormones are called androgens and the female reproductive hormones are called estrogens.

Adrenal glands: The adrenal glands are lying close to the kidney, but not related to it in function. The adrenal glands consist of two parts such as adrenal cortex and adrenal medulla. The first is the outer cover and the second is the inner core. These glands contribute to the functioning of nerves and muscles and help the whole body to meet with stress. The adrenal cortex is under the control of the pituitary gland and produces a number of chemical substances like the steroids. The cortex works with gonads to the development of secondary sex characteristics. It also helps to control sexual functioning. Both the adrenal cortex and medulla are involved in the body's reaction to stress. The adrenal glands secrete two kinds of hormones. The hormone secreted by cortex is called cortin and that produced by the medulla is called adrenin. The adrenin is a very powerful hormone which is having much influence in the emotional life of the organism. A very little amount of adrenin in the blood may produce several effects in the organism like faster heart rate, increased blood pressure, dilation of the eyes and so on. (Fig. 6.4).

In the extreme emotional state the adrenin is secreted more and there is more sugar in the blood. Then the physiological changes like rapid heart-beat, high blood-pressure and all other bodily changes like stopping of digestion, perspiration, erection of hairs are taking place. The organism is responding to something

in the outside world with fear or rage. The adrenal glands are innervated by the autonomic nervous systems in all these states.

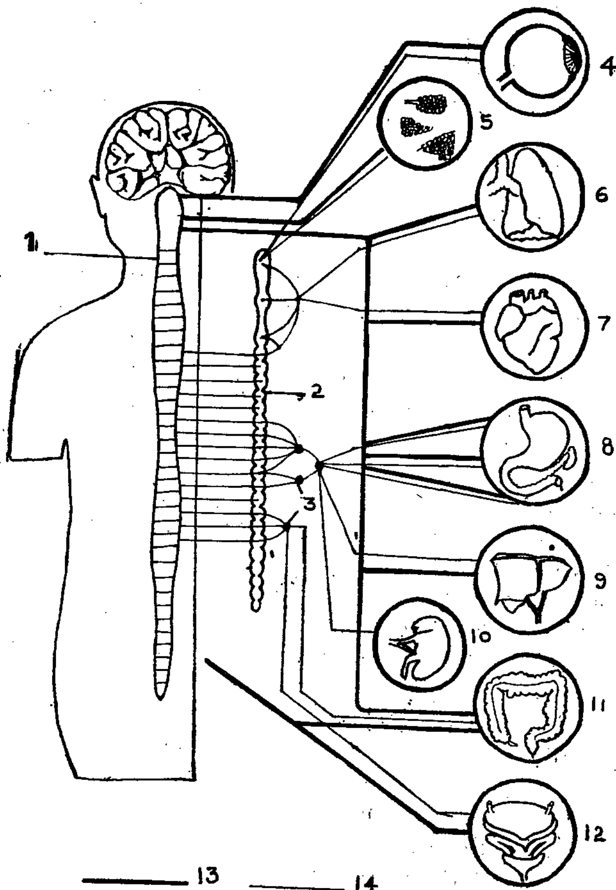


Fig 6.3. Emotion : The Autonomic Nervous System

1. Spinal Cord
2. Chain of Sympathetic Ganglia
3. Ganglia
4. Eye
5. Salivary Glands
6. Lungs
7. Heart
8. Stomach, Spleen, Pancreas
9. Liver
10 Adrenal Gland
11. Colon
12. Bladder and Sex Organs
13. Parasympathetic
14. Sympathetic

CHARCTERISTICS OF FEAR AND RAGE

The general emotional state is the display of the bodily energy. It is sheer excitement. The emotions of early infancy or childhood period are mostly of the general excitement without any specific characteristics. Therefore, in our attempt to classify the various types of emotions we could observe only the undifferentiated excitements. But the excitements may vary in intensity. This may reveal certain specific responses and we may name them as fear, rage, thrill, surprise, irritation, love and so on. Each of these emotions is a feeling and also a motor set. Every emotion is a matter of personal experience and the personal experience varies from person to person, situation to situation. Therefore, any attempt to describe emotions subjectively and through physiological changes or glandular activities may not be accurate and complete. Let us describe the characteristics of the standard emotions of fear and rage with available information.

Fear: Fear has been classified as one of the emergency emotions in psychological studies. According to J. B. Watson (1878-1958) it is one of the three primary emotions. The other two are rage and love. The instinct theorists like William McDougall (1871-1938) and others are of the view that the emotion of fear finds its roots in the instinct of flight which is an inborn tendency in all living organisms. Watson says that fear is a learned response and it can be aroused in a person. Fear is a response to a painful stimulus and the organism by taking a flight tries to avoid it. It varies from person to person and from culture to culture.

Several studies have been made on children and found that they were showing wide variations in their fear responses. Some children were extremely fearful of everything while some were free from fears. If a child met with a few painful events he showed signs of fear, otherwise he was not. Fear can be aroused in a child easily. A loud noise at close range would frighten

the child terribly. Watson had demonstrated that children did not have inborn fears of snake, fire and other stimuli believed to arouse fears. Therefore, emotions depend upon learning.

In the developmental stages every child must learn to walk and he is likely to have some painful experiences. He might have fallen down several times and had painful feelings as he had not gained sufficient strength to stand up and walk without help. Therefore, he might have developed some fears, the fear of loss of balance, lack of bodily support, absence of other people or loneliness and so on. While the child has learned to walk he might have developed fear of high and low places as he might have had hurting experiences. Similarly, when one is alone or far away from mother he has the fears of loss of comforts and hunger.

Several names like terror, dread, horror, fright alarm are also associated with the emotion of fear. Many kinds of responses have been observed in studies made on fears. Some of the responses of fears are startle pattern, turning head, twisting the trunk, shrieking, shrinking, shivering, shaking, trembling, sweating, vomiting, loss of control of bowels and urinating, increased pulse rate and rapid breathing.

As the child grows into an adolescent and adult he learns to deal with fearful situations and threats. Then the fears disappear. But if they reappear at maturity they symbolize as adult problems. Psychologists call these as symbolic fears. It is not possible to remove symbolic fears easily. If we want to remove it we must find out first the underlying basic fears.

The level of fear arousal is not unlimited. There is certain level of limit for our emotion of fear. If the fear causing stimulus is carried out beyond certain point the organism gets disorganized. Both the central and autonomic nervous systems are fully put into action very

vigorously. The organism may fail to respond to the situation. R. S. Woodworth says that life would not be interesting without the emotion of fear. According to him fear is a kind of thrill. Amusements, adventurous activities and sports will have no fascination if there is no thrill. There is a joy when you escape from a dangerous situation which had caused you fear.

Rage: Rage or anger is an emotional response which varies widely. It is a response mostly to interference or frustration. No organism is free from this emotional response of rage like fear. You get angry with your friend when he fails to understand your argument. The child gets angry if you interfere with his play or toys. The mild animal, cat gets angry if any one goes near her kitten. The hen gets angry even with her mistress if she touches the chicken. Even Saint Vishwamitra was not spared from this emotion.

If you snatch a toy from a child's hand he at once shrieks, shouts, jumps, kicks, bites, rolls on the ground and so on. Thus the emotion of anger is expressed in various ways when a person's self esteem is injured.

Rage is one of the many mobilizing emotions, drives man to strong action. The instinct theorists consider that anger is the outcome of the instinct of pugnacity. It is an innate, hereditary impulse to fight and destroy the enemy. Sigmund Freud (1856-1939) says that anger is a form of death instinct. The instinct theory fails to convince us with its explanation that anger is an instinct like hunger and thirst. But the frustration-aggression hypothesis explains that the emotion of anger is a consequence of frustration to some goal seeking activity. If you are feeling hungry and food is not served you get angry. Your anger mobilizes more energy in your body to attack and remove the obstacles on the way of your goal. This anger is the consequence of frustration. In your everyday life you might have experienced several such angers.

In some cases anger is a potential aid in dealing with the problem. In winning a game, in solving some difficult problems you may become angry with them and aggressively deal with them. Sometimes you even throw a challenge that you are going to win the game.

But it is very difficult to determine the manner in which anger is expressed. There is no inherited facial pattern of anger. It is very difficult to distinguish one emotional response from another. Emotional responses vary in intensity and human beings conceal emotions. Therefore, the activation theory holds the view that only the emotional intensity would be relevant to distinguish one emotion from another. It is true that we express our anger in some way in our every day life. But that is not the universal way of response. Like all other unpleasant emotions the emotion of anger involves threats to bodily equilibrium. The sympathetic nervous system comes into action and there is higher pulse rate, blood pressure, respiration and also interferences with digestion. It is observed in several studies that chronic high blood pressure is associated with persistant anger.

Anger often functions as a motive and is called psychological motive. It mobilizes energy and supports vigorous activity. It intensifies threats and actions in the goal seeking activity.

THEORIES OF EMOTION

We have discussed the functions of the endocrine system and the action of the autonomic nervous system, under the heading of physical aspects of emotion.

The autonomic nervous system plays an important role in the emotional life of the organism. But we are also interested in knowing what role the brain is playing during the emotional responses the organism is making. Only on the basis of this information a theory of emotion could be formulated. Modern psychologists were able to

formulate several theories of emotion from the information available to them from physiological studies. We are interested in three important theories of emotion. They are (1) James-Lange theory, (2) Cannon-Bard theory and (3) Cognitive theory.

James-Lange Theory: This is one of the most influential theories of emotion. This was first announced by William James (1842-1910), a famous American Psychologist in the 1880's. Almost at the same time the Danish physiologist Carl Lange (1834-1900) arrived at the same conclusions. Therefore this theory is known as James-Lange theory. The general statement of James-Lange theory is that emotion results from physiological changes rather than that emotion makes physiological changes. Therefore James-Lange theory runs reverse to what was believed by scholars previously about how emotions are aroused. The thought held previously was: You see a tiger, you feel afraid and you run. According to James-Lange theory the thought was held like this: You see a tiger, you run, and you feel afraid.

The James-Lange theory holds the fact that when you see an emotion arousing stimulus, the tiger, a number of physiological responses occur immediately in you. Then only you feel the emotion, the fear. This emotion of fear is caused not by the direct perception of the tiger, but by the physiological changes. The changes such as pounding of the heart, dryness in throat, shivering or shaking of the body and so on are caused on seeing the tiger. The James-Lange theory does not relate the emotional responses to any special centres of the brain. According to this theory a receptor is stimulated by an object and the nerve impulses are sent to the cortex (brain) where the stimulus (the tiger) is perceived. The nerve impulses are transmitted to the muscles, skin and visceral parts and changes are caused in them. When these changes are communicated to the cortex (brain) the resulting emotion is fear. This would mean that physiological changes precede the experience which

we call an emotion. Therefore, an emotion consists of these sensory impressions and these impressions are initiated by the physiological changes. The physiological changes which arise upon perceiving the stimulus is the basis of the emotion. The James-Lange theory is called a peripheral theory because it emphasises body as the basis of an emotion and not the brain.

Cannon-Bard Theory: The peripheral theory which we have described above raised certain controversial issues. The theory was verified by certain physiologists, concerning the centres of emotion. In certain experiments conducted on animals the nerve fibres which bring impulses from the vital organs to the brain were cut to see whether the animal expresses emotional responses even after the removal of the impulses.

In the year 1527, an American Psychologist Walter B. Cannon (1871-1945) questioned the validity of the James-Lange theory. He was of the view that when some physiological changes like heart beat and sweating were experienced for emotions like fear, anger and excitement how can we differentiate one emotion from another ? The same type of physiological responses occur in different emotions. Cannon's strong point from his experiment to reject the James-Lange theory is that if the viscera of an animal were separated from its central nervous system — that is, if the nerve impulses were cut off, the emotional behaviours of the animal remain unchanged. Similar view has been expressed by C. S. Sherrington in 1906. Sherrington had conducted an experiment on a dog. He cut the nerve fibres going to the brain from the dog's vital organs. Even then the dog continued to show the emotion of rage. Therefore, emotion is not depending solely upon viscera. Cannon strongly believed that emotion depends upon hypothalamic activities and not on peripheral activities.

During the same time Bard was working on the thalamus and reinforced Cannon's views. In this way

additional knowledge was accumulated concerning the centres of emotion and the Cannon-Bard theory was developed.

The Cannon-Bard theory has proposed that there are certain brain centres which are involved in the emotional responses. These brain centres are thalamic and hypothalamic centres. This theory also states that emotions and bodily responses occur simultaneously and not one after the other. According to this theory, when an organism perceives an emotion arousing stimulus nerve impulses pass through the thalamus part. At this point the impulses are splitting and some of the impulses go to the cortex and some of them go to muscles and viscera. In the cortex the stimulus is perceived and the emotional response is felt. At the same time in the muscles and viscera physiological reactions are taking place. This is how an emotion is experienced.

Cognitive Theory: The cognitive theory of emotion is a very recent development. The founder of this theory is Stanley Schachter. He accounts visceral changes of James-Lange theory in this theory. He proposes that the interaction of cognitive processes and physiological changes produce emotions. According to this theory, we feel an emotion when there is a physiological state of arousal and the awareness of this state in us together. The interpretation of emotions depends upon our past experience and the present environments. The experiments conducted by Schachter and Singer to test the effect of cognition on emotion would explain the theory very well.

Another cognitive theorist Stuart Valins holds that a bodily change like increased heartbeat itself leads to emotional reaction. When there is increased heartbeat suddenly in you, immediately you wonder and ask yourself why it is happening and you become frightened if you do not know the reason. Magda Arnold has made a thorough discussion of contemporary views of emotion.

Arnold stresses the importance of cognition of emotions. She had formulated a theory called Arnold's theory. According to this theory, the emotions we feel depend mainly on our cognitive appraisal of the situations. Arnold says that there are five stages that occur from perceiving a stimulus to putting an action on it. The stages are perception of the stimulus, appraising the situation, arousal of emotion, expression of emotion and the action. Arnold's theory appears to be more realistic than the other two. The theory is not interested in what is going on inside the body, because the inter-relation between physiology and emotion is a very complicated process and no part of the body is solely responsible for the emotional responses.

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Chapter 7

PERSONALITY

WHAT IS PERSONALITY ?

The term 'personality' is one that is used very often both in the common sense world and in the scientific world. This term is used to describe a person as he is perceived by other person. Generally we may say that a person has a 'good' personality or a 'poor' personality. When we say a 'good' personality, we may mean he is a good-looking, handsome person or he possesses such of those qualities like being optimistic, sociable, honest or friendly. When a person is being referred to as having a 'poor' personality, we may mean that either he is physically unimpressive or that he is dishonest or possesses qualities that are undesirable. When we use any one of these descriptions in our discussion or conversation, we mean that the particular quality or characteristic is the part of his nature, and that it manifests consistantly in his general behaviour.

While interacting with the environment, every human being manifests many personality characteristics or traits. Each one of the traits that manifests is the part of that individual's total behaviour. Several traits may be manifesting in the same individual on several situations. All the traits are related in such a way that they are integrated into a unit. In other words, it is the organization of the personality traits in a unique fashion that is referred to as 'personality'. Having in view all these, personality may be defined as the organisation of all the physical, mental and social qualities in an individual, that manifests in a particular way, while he interacts with the environment. Thus, the term per-

sonality includes in it, the organisation of various dimensions of the individual like that of his attitudes, interests, intelligence, and capacities, which emerge out of the individual's interaction with the environment including the social environment.

It is true that some psychologists stress upon the importance of the social milieu in the personality development of the individual and some other on the uniqueness of the individual. But, most of the psychologists are of the view that personality should be understood comprehensively as the total picture of a person's nature and behaviour.

ENDOCRINE GLANDS AND PERSONALITY

One of the oldest known theories of personality is a classification of temperaments, based on the humors or fluids of the body, for which the Greek 'father of modern medicines' Hippocrates laid the foundation. In modern times, stress is being laid on the influence of the secretions of hormones by the endocrine or ductless glands. The hormones secreted by the endocrine glands are having great influence upon the development of personality traits. The hormones secreted by these glands are directly injected into the blood stream. These hormones have the capacity to increase or retard the activities of the body and its organs. The hormones stimulate the tissue activity, regulate growth and control metabolism.

The important endocrine glands are, the thyroid gland, the adrenal glands, the pituitary gland, the parathyroid glands and the gonads or sex glands.

Thyroid gland : The thyroid gland is situated at the base of the neck. This gland secretes a hormone known as **thyroxine.** Thyroxine contains iodine in combination with an aminoacid. This hormone regulates the metabolism of the body and growth. Deficiency in the supply of iodine or an interference with its assimilation results in a decrease called **simple goitre.** Administration of

iodine cures this malady. Inaction or partially active thyroid in children results in an arrested growth of development known as **cretinism.** The child grows to be a **dwarf** and his mental capacities are impaired. Deficiency of thyroxine in adults brings about a diseased condition known as **myxoedema.** In this diseased condition the skin is dry and coarse and excessive growth of connective tissues below the skin occur. Dullness of mental processes can be observed. The patient's face appears to be expressionless. Excessive secretion of this hormone increases the metabolic rate and the individual becomes easily excitable and nervous.

Adrenal glands: The adrenal glands are a pair of small triangular bodies lying above the kidneys. While the removal of both the glands may eventually prove fatal, the diseased conditions of these glands will result in great muscular weakness, low blood pressure and dark pigmentation of the skin. Each gland is composed of two kinds of tissues, **cortex** and **medulla.** These two have different functions.

The cortex is essential to life and it secretes a hormone called **cortin.** Cortin controls the sodium and potassium salts in the organism and maintains the balance of sodium salt. The loss of sodium salt in excess leads to the symptoms we have already mentioned, namely lowered blood pressure, muscular weakness etc., and this is known as **Addison's disease.**

The medulla of the adrenal gland secretes a harmone called **adrenalin.** Adrenalin is released in greater amount in organism during stressful and emergency situations and by increasing the strength and activity of the organism helps to protect itself.

Pituitary gland: This gland is located at the base of the brain and is about the size of a pea. It consists of the **anterior** and **posterior** lobes, each one of these having different functions.

The removal of the anterior lobe of the pituitary gland in the young animal brings about (i) retardation of growth, (ii) arresting of the skeletal development, (iii) nondevelopment of sex glands, and (iv) the atrophy of the thyroid and adrenal cortex. Over-activity or underactivity of the anterior lobe results in certain abnormalities in the growth of man. Excessive secretion before maturity results in **gigantism,** marked by exaggerated rate of growth. Excessive secretion in adult life after the maturity results in **acromegaly,** characterised by the prominence of the cheek bones, bones of the upper and lower jaw. Under-secretion of the anterior lobe results in what is called infantilism, marked by stunted skeletal growth, delayed sexual maturity, tendency towards feminity etc.

The posterior lobe of the pituitary gland produces a hormone known as pituitrin. When this hormone is injected in a normal man or an animal it results in a general rise in arterial pressure. The hormone causes also a contraction of the intestines, the urinary bladder and the uterus in the female. The pituitary gland has been termed as 'the master gland of the endocrine system', because of various functions it carries out and also because of its influence over the functions of the other endocrine glands.

Parathyroid glands: These are two pairs of small bodies, lying in close relation to the thyroid. The hormone produced by these glands controls calcium metabolism. Diseased condition of these glands leads to fall in calcium content of the blood leading to convulsive disorders of the skeletal muscles (tetany). Excessive secretion of these glands may also be characterised by muscular weakness, depression of the nervous system etc.

Gonads: The gonads are also called sex glands. Ovaries in the female and testes in the male mainly function as reproductive organs. They also produce

internal secretions, which are responsible for the development of secondary sexual characters. These characters generally appear at the onset of puberty or sexual maturity. The growth and distribution of hair over the face and chest in the male, the deepening voice in him and the widening pelvis and development of breasts in women are some of the secondary sexual characters.

Thus, we find that the ductless or endocrine glands and the hormones secreted by them play a vital role to contribute to health and development of personality. Optimum physical and mental health depends upon the proper balance of the secretions of the different endocrine glands.

Thus, it is important for us to realise that the ultimate nature of the personality is, dependent upon the physical foundations and its interactions of the social environment of the individual.

TRAITS AND TYPES OF PERSONALITY

Traits: The personality of an individual comprises of many traits. A trait refers to the inherited or acquired charasteristic in thought, feeling and/or an act. The presence of a personality trait in an individual differs in degree on a continuum. Thus, for example, if we have impulsiveness as a trait, it is obvious that some people are highly impulsive, some are rarely impulsive and others are impulsive to a certain degree. In each of the traits, most people are about the average with few persons possessing them to extreme degrees either high or low. Several of the personality traits come in pairs of opposites like that of being Rigid-Flexible, Cheerful-gloomy etc.

Many psychologists have attempted to enumerate various kinds of traits of personality. They met with many difficulties in such attempts. The number became unwieldy. They have also found that many of the traits

are independent and one trait found to be leading another.

The general agreements about personality traits are that they are reasonably established during early years of life and that found to be existing throughout one's life.

Types of personality: One method of study to understand personality is by studying differences between individuals. The method was developed from objective observation. It has been observed that a number of individuals possessed a characteristic or a constellation of characteristics in a particular pattern, that they were all considered to belong to a 'type'. These characteristics may refer to a temperament, direction of interest or a pattern of behaviour. Personality types may be based upon physical or mental characteristics. For example, Kretschmer, a German psychiatrist, has classified people mainly on the basis of body build forms among psychotic patients. According to him human beings can be classified into three types. They are pyknic, asthenic and athletic types. Those who were stocky, round-bodied and short-limbed were 'pyknic'. The pyknic type of personality is characterised by extroverted behaviour. They are social and outgoing. The slender, thinly, angular, long-limbed and long-bodied individuals were called the 'asthenics'. The asthenics are prone to withdraw from social contacts, keep away from reality, and to engage themselves in day-dreaming. They are introverted and shy. The muscular, non-perfect individuals were called as 'athletics'. The athletics are aggressive and active.

Following Kretschmer, Sheldon also classified people into three types such as (1) the endomorphic, (2) mesomorphic, and (3) ectomorphic. Those who showed prominence of the abdominal region or the digestive viscera are endomorphics. Those who showed prominence of

bone and muscle are mesomorphics. Those who showed a prominence of long delicate bones and fragile structures are ectomorphics. Sheldon's measurement of body type is an improvement over those made by Kretschmer.

INTROVERSION-EXTROVERSION

In the preceding paragraphs, we have described 'personality types' based upon physical differences. One of the important classifications of people into different types is based upon the analysis of attitudes of introversion and extroversion. This theory has been formulated by Carl Gastav Jung. Jung had proposed two general attitude types of personality. He called them as introverted and extroverted. The introverts are those whose interests are directed inwards rather than outwards to the outside world of men and matters. The introvert prefers to be reserved and to stay in solitude. He shuns associations and likes to be left alone. He is given to day-dreaming and suffers from feeling of inferiority. He is extremely shy and withdrawn. He is not a sociable individual and does not mix with people. He is more concerned with his private world. On the other hand, the extrovert is a person who is highly sociable and enjoys the company of people. He takes great interest in social and cultural activities. Under all circumstances he hates to remain alone. He is highly self-assertive and goes out to attain prestige and self-importance. He is usually a frank and outspoken individual who finds it difficult to attend to details in any of his activities. He is more interested in the external world.

Though the above descriptions of the two types of personality makes one feel that they are two distinct dichotomous groups, we should bear in mind that both the tendencies in different degrees are present in the same individual. For example, a person may be consciously an extrovert but unconsciously an introvert.

MEASUREMENT OF PERSONALITY AND PERSONALITY INVENTORIES

Having seen as to the nature of personality and the various influences that account for the development of personality, let us now look into methods that are used for the measurement of personality. We shall here discuss two of the important methods namely the questionnaire method and the interview method.

INTERVIEW

For the purpose of understanding and sizing up the personality of another, this is a popular method that is being used. It is used more commonly in the appraisal of applicants for a position. Interview technique is being made use of for diagnostic as well as therapeutic purposes in a clinical setting. Talking to a person, after the establishment of a congenial rapport, in a face-to-face relationship, certainly throws more light on the personality of the interviewee to the interviewer. But the method of interview has its own limitations. Dependence upon the judgment of the interviewer is a great set back of the method. Judgments are subjective and to that extent, this method lacks objectivity. There have been attempts to improve the method of interview by making it more objective, amenable to scoring and more reliable. These attempts are likely to result in greater restriction of content and thus may lead to eventual decrease in valid results. Anyway, some of the suggestions for making interview method more useful are as follows:

(i) Framing questions in such a way that a definite reply is required.

(ii) Establishing the favourable and congenial personal relationship (rapport) with the interviewee.

(iii) Distinguishing between relevant and irrelevant questions and answers.

(iv) Keeping a careful and objective record of facts and inferences.

(v) Using a standardised form of report.

(vi) Making a clear statement of personal reaction.

In short, the use of interview in the personality evaluation of an individual is more helpful with an interviewer who has psychological insights.

QUESTIONNAIRES

Questionnaires are used to assess the personality type of which a person 'belongs', and/or to study personality traits or general characteristics of personality. This method seeks to measure personality by securing the opinion of a person about himself. Usually a questionnaire consists of series of questions, in printed form, for which the subject is required to give

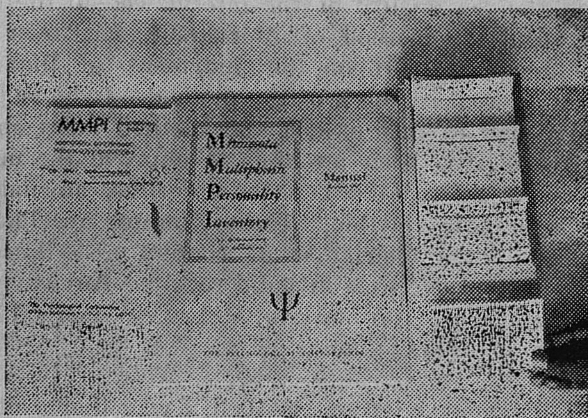


Fig. 7.1. Personality : Minnesota Multiphasic Personality Inventory

a standard form of answers. For example, to tick or underline the answer 'Yes', or 'No' or 'doubtful'. Then, all the answers for the entire test is scored and interpreted. There are several personality inventories of this

type which are used by psychologists for assessment of various dimensions of personality. Some of the inventories making use of the questionnaire method are (1) Minnesota Multiphasic Personality Inventory, (2) Maudsley Personality Inventory, (3) Tests of introversion-extroversion, etc. (Fig. 7.1).

When compared to the use of questionnaires, the rating scale is more technical and involves more of sophistication in its construction. The rating scale method aims at finding out the opinion of the subject regarding the **degree** to which a particular trait or characteristic is present or absent in an individual. While trying to measure a trait in such a way, then, five or seven degrees or points are fixed. They are usually referred to as '*three-point scale*', '*five-point scale*', etc. For example, to the statement 'I am too sensitive to the things my family say', the response should be one of the following, and the individual is asked to make a check mark against the response with which he agrees :

1	2	3	4	5
Completely True	Mostly True	Partly True or Partly False	Mostly False	Completely False

The limitations of the use of questionnaires and rating scales are that we may not be able to get at reliable answers, which may be due to errors of judgment that may occur due to factors like prejudice.

PROJECTIVE TESTS OF PERSONALITY

Apart from the tests like what we have mentioned, there are some tests of personality which are used by

psychologists for assessment of personality. These are called the 'Projective tests' because the subjects who respond to these tests, without their own knowing, project on to the test materials, some of their unconscious needs, motives, urges and fears. Though there are many such psychological instruments which are being put to use, here we shall discuss only two of the important projective tests.

RORSCHACH TEST

This test was formulated and developed by a Swiss psychiatrist, Hermann Rorschach. The test was published first in the year 1921. The test consists of ten large white cards. On each of these cards, we find an ink-blot. The ink-blot appears as two symmetrical halves which might occur from folding a piece of paper, so that ink is smeared on each half. Five of these ten cards appear in different shades of grey (achromatic) and the other five cards include other colours as

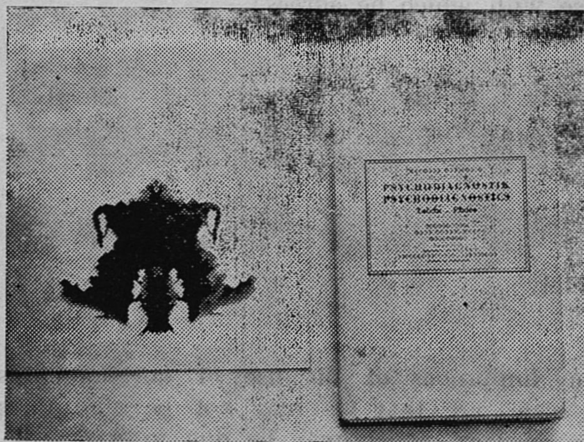


Fig. 7.2. Personality : Rorschach Ink-Blot Test

well. The test is given individually. The subject is required to tell the examiner as to what he 'sees' in each blot. Based upon the responses, the examiner scores and interprets them. For such interpretation

several indices like that of location, colour, texture, and position are used. Scoring and interpretation of Rorschach responses is a highly skilled task and intensive training for such a work is a pre-requisite. (Fig. 7.2).

THEMATIC APPERCEPTION TEST

Another popular projective test of personality is the one called the Thematic Apperception Test,

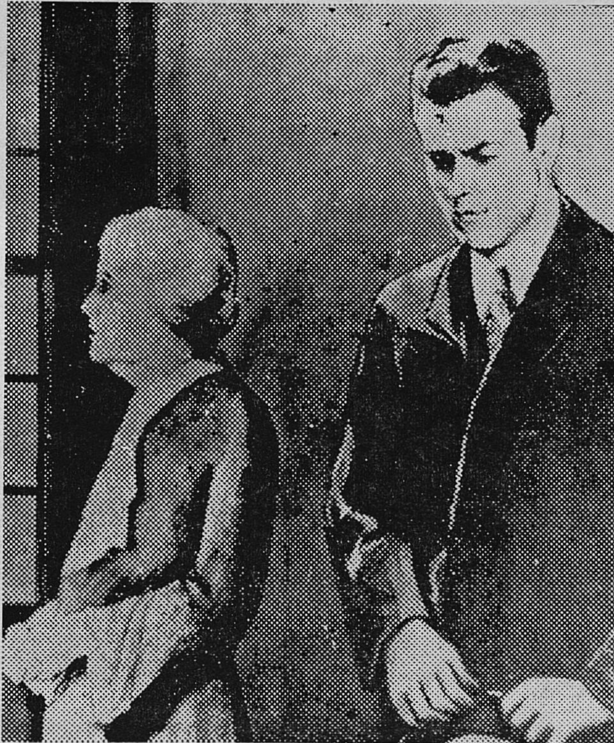


Fig. 7.3. Thematic Apperception Test

known as T.A.T. In this test the individual is presented with a set of cards that contain pictures des-

cribing ambiguous social situations. The subject is asked to build a story about the picture. He is asked to describe as to what is happening in the picture, what are the antecedants that are likely to have lead to such a situation and also to describe as to what is likely to be the outcome of such a situation. Scoring is done by analysing the content, to determine the underlying theme. Besides a quantitative method is being made use of for interpretation of the responses. (Fig. 7.3).

Chapter 8

MENTAL HEALTH AND ITS PRINCIPLES

In the preceding chapters we have depicted the various aspects of the nature of human behaviour. You might have understood how the human organism functions successfully by responding to various kinds of environmental conditions. But the human organism sometimes fails to respond successfully in its environments. This failure leads to a condition called maladjustments or mental illness. Therefore, it is essential for an individual to follow certain principles that would help him to make satisfactory and wholesome adjustment to the demands of his environment. If a person could make such an adjustment and also can live in harmony with himself, he is said to be well adjusted and mentally healthy.

Before we can think of the principles that might contribute to mental health of an individual, it is but essential that we should understand the meaning and significance of the term 'mental health' and some of its related terms.

WHAT IS MENTAL HEALTH ?

When a person reveals or demonstrates a particular pattern of behaviour or some personal qualities or characteristics which are considered pleasant and desirable to the demands of the society, he is said to be mentally healthy. The term 'mental health' is closely related to the concept 'adjustment'. Sometimes both the concepts mental health and adjustment are used synonymously.

Though the expressions of these two terms are used interchangeably, there are certain differences between them which needs to be examined. Firstly, mental health is more of **personal** in its reference than adjustment, whereas adjustment is more of environmental. We can think of a person who is well-adjusted in one area of life, but not in another. But we cannot imagine a person to be mentally healthy in one sphere but not in another. Thus, we have to consider mental health as being a personal quality or characteristic of the individual, being present in the total behaviour of the individual.

Secondly, mental health is something enduring and consistent, rather than being a variable in time, whereas the concept of adjustment is more dynamic. Even if a person has difficulties of adjustment, he may still be considered mentally healthy.

Thirdly, the concept of mental health is used to refer to such of those qualities and characteristics that are possessed only by few persons and which are worthy of emulation by the society. Thus, mental health is thought of as a superior kind of adjustment.

Fourthly, mental health implies the concept of 'health' and 'disease' as we find in the study of medicine, whereas the concept of adjustment does not have such implications. The reverse of mental health is thought to be mental illness. If we draw parallels between physical health — physical disease and mental health — mental disease, we will find that a state of health implies absence of symptoms of disease, a state of well-being and a position in which a person can function efficiently and effectively. In the same way, illness could imply the manifestations of certain symptoms caused due to certain factors, which are to be diagnozed and given appropriate treatments.

PRINCIPLES OF MENTAL HEALTH

We have, so far, considered the nature of mental health. We shall discuss here the adoptions of certain principles that might contribute to the promotion of mental health and prevention of mental illness and particularly those principles of mental health applicable to youth.

It is essential that for the maintenance of optimum mental health a person should possess the following characteristics. They are mostly psychological in nature. A man must keep himself in some activity. The very fact that he is kept in some kind of activity itself would enhance his self-esteem. This is first step towards happiness.

1. Therefore, first of all one must learn and find out means to be happy in life, and derive satisfaction in his activities. Whether a person does a small job or big job, earns little or more, must find satisfaction in it. He is involved in several areas of his personal life. He must try to be content with what he achieves.

He must adjust himself with people involved in all those areas. For example, the individual must deal with his family members like wife and children and other relatives. He is expected to be friendly with his neighbours and people in the street. If he is employed in some organization or industry, he must find pleasure in working along with them. He must try to create a harmonious relationship in the environment. Only in a harmonious environment one can fulfill his needs and thereby find satisfaction.

A man is mentally healthy if only his personality functions well in an integrated manner. When all his needs and desires are fulfilled in a harmonious and co-ordinated manner, the person is said to be happier and mentally healthier. He responds to the personal and

social and environmental needs and problems without any mental strain or anxiety. He understands his capacities and accordingly sets his ambitions and aspirations and therefore he realizes them into real life.

It is important that a man must understand himself for a positive mental health. It is called self-understanding. One must know what he is. The individual should make an objective evaluation of his own potentialities, abilities, interests, aptitudes and his own strength and weakness. It is a difficult thing. That is why self-understanding is referring to the capacity one possesses for estimating himself. Only on the basis of the right estimation of the self one should accept the self. Therefore, self acceptance arises only after self-understanding and self-estimation. Self acceptance is not taking oneself for all excellences. It is also to recognize the faults and weaknesses.

Besides, he must be able to understand why he feels in certain situation in some particular fashion. For example, the individual may feel shy, timid, withdrawn, sensitive, hostile and so on. These two processes of self-understanding and self-acceptance may bring out changes in one's attitudes and habits to promote self-improvement. This may facilitate the promotion of mental health.

Therefore, we may say that self-acceptance is the recognition of one's capabilities and limitations by himself. A self-accepting person is able to make a realistic approach to his life situations. In the face of success or failure, he is not swayed and disturbed by extreme emotional reactions.

2. One must learn to face the situation with normal feeling. The desire to avoid emotion is a hypocritical type of detachment for life situation. This should be avoided as it will lead to suspicion of every emotion and

thereby the ability to enjoy joy and sorrows is lost. But, what is normal feeling in one culture is not normal feeling in another culture. Therefore, one must accept the naturalness of emotion as they arise.

3. Personal growth, personal maturity and personal integration are other indications of positive mental health. Personal growth refers to realization of one's potentialities and becoming the best and fullest person one can become. Personal maturity refers to the ability of an individual to be able to manifest such behaviours that are appropriate to his chronological age, able to carry out the developmental tasks that are appropriate to various developmental shapes. Personal integration refers to the unity and stability of the individual personality.

4. A mentally healthy individual is one who could develop a commitment to some form of work through which he can achieve a lasting sense of satisfaction as well as the economic means for himself and his loved ones. Hence, students should have a sense of commitment and a flair to do well in their studies. Achievement in the academic sphere serves a two-fold purpose. (1) It gives him a place of pride in the society and increases his prestige, (2) Good academic success may open up the door for good occupational career. Hence, studies should not be taken up for reasons that do not contribute to a sense of achievement. Studying for the sake of pleasing the parents, or for passing the examinations will not make one as happy as the reasons of interest and commitment would bring. Study and work might be viewed as the expression and development of the self. Also, there should be an active willingness to develop the maximum. If one engages himself in study or some kind of a job with reluctance and unwillingness, it is likely to lead him to the sense of failure and dissatisfaction in the long run. Unused or missed opportunities of life is likely to bring about feelings of guilt and frustration that would effect damage to the mental health of that person. For

a person to achieve happiness and success, he should have an urge to be successful. This means that a person should possess a level of aspirations that is high and at the same time realistic in terms of his abilities and capacities. The goals should be set before him and efforts should be made to achieve them.

5. Another factor that is related to our mental health is, being honest with oneself regarding certain matters. In a family situation, for example, some of us may have certain types of undesirable feelings and attitudes towards certain members of the family, like the parents or siblings. These feelings and attitudes are so very painful and unacceptable, that we may not ourselves admit them. These negative feelings are hidden and they become unconscious. However, they continue to influence our behaviour. A mother might overtly shower affection on a child whom she unconsciously hates. In the name of wanting to select a very good bridegroom, a mother was rejecting every proposal of alliance for her daughter, which stemmed from an unconscious wish to 'punish' the daughter towards whom, she felt hostile. If one cultivates the habit of being frank to himself such unconscious tendencies might get minimised, if not altogether avoided, which would be conducive to the mental health of an individual.

6. One of the important factors that influences the young person is the emergence of sex feelings and awareness of the same. Problems associated with sex are many, varied and complex. However, here, we shall consider some of the desirable attitudes towards this phenomena. Growing sex feelings and sex urges are normal and natural as a person has reached the adolescent stage, when biophysical development has nearly reached its completeness and when he has become capable of reproduction. The emergence of such feelings is not to frighten or induce feelings of guilt in the individual.

In our cultural setting sex is something that is viewed to be 'bad' or should not be spoken outwardly. Hence, there is no proper provisions to offer 'sex education' suitable to the various developmental stages. Because lesson on sex is not taught in schools and colleges and since parents feel embarrassed to talk about such topics to their children, the young adolescents secretly gather information regarding sex through their 'friends' and through cheap magazines and journals. This information is often incorrect and misleading. The secret way of collecting sex information often instills a feeling of fear, guilt and shame in the individual. Therefore, it is wise that the young people should go to psychological counselling centres or clinics to have certain discussion and counselling regarding matters of sex.

7. Young people should realise that certain social and moral requirements are inextricably associated with sex. Man is a social animal. He must live to the expectations of his society. His needs are governed by the codes, conventions and traditions of the society. The behaviour of a human being has to be regulated within social expectations. Therefore one should learn to confirm himself to the normal social standards and values. Going to contrary to the normal codes will infuse a feeling of guilt and shame, which is likely to cause damage to mental health.

8. Another factor that could impair mental health is a strong and unfounded feeling of inferiority. The feeling of inferiority may be so deep and influential that it may make the person feel extremely helpless and miserable. This feeling may be caused due to faulty upbringing of the individual during his childhood by his parents. During the early formative years, the individual might not have been provided with opportunities to develop self-confidence and self-reliance. The parents might have tended him to be over-protective due to many reasons. For example, he might have been the only child

or might have been a weak child. Overcoming this type of inferiority feeling is not easy. It requires planned and consented efforts. The individual's efforts should be directed into some kind of constructive and creative activities. He should be engaged in such activities like stamp-collection, gardening etc. or some kind of entertainment like dramatics, painting etc. or in some kind of social welfare activities. Such activities may help him to get rid of his feeling of inferiority. He should be made aware of his own achievement or his activities. Achievement in these kinds of activities helps a person to foster self-confidence and thereby helps him to overcome such feeling. One must be able to assess his strengths and weaknesses and capitalise on his assets, instead of brooding over his liabilities. Discussion of one's problems with matured and experienced person may be of use in this connection. As it happens more often, feeling of inferiority grow out of imagined deficiencies and handicaps. An optimistic and wholesome attitude to seek beauty in things around him may help one to overcome these detrimental feelings.

9. How one deals with his emotion is an important factor that contributes to one's mental health either positively or negatively. Every emotion, including the negative ones like that of fear or anger serve a definite purpose and is useful, if they are the result of adequate and relevant stimuli. But the occurrence and persistence of such emotions in the absence of accountable stimuli is disruptive to the individual. Hence, we should learn to control and avoid these kinds of feelings as nothing good comes out of them.

10. Work and serious business of life alone does not make one's life. We all have leisure and free time during certain part of the day. One must learn to make use of this usefully and enjoyably. Cultivation of interest in some hobbies adds spice to life. As it is said, an indolent mind is a devil's workshop. Hence, hobbies and interest may fulfil some important human needs. If

some altruism is put into the type of hobby one pursues like that of social work and scout activities, it adds to the richness of life. The very feeling that you have been helpful to another person in times of need has an invigorating and exhilarating effect on you.

11. As an individual grows, he must be able to realize that obstacles, difficulties and frustrations are a part of his life. He must be able to give up the kind of wishful thinking that life will be without problems and everything in life will turn out to his advantage. He should be courageous enough to accept and face the problems that confront him. He should be in a position to face the challenge and overcome his problems.

Growing into maturity is an important developmental stage of an individual. When we are children, we are unavoidably dependent on adults and especially the parents. But, as one reaches maturity, he should be able to express his individuality and become independent. This does not mean that the individual should disregard the parents and elders. In short, one cultivates and develops the ability to make his own decisions. In some cases, it so happens that parents out of their anxiety to see their children well-behaved and well-placed, continue to watch, direct and thrust their thinking and decisions on their children, even after they are grown up. Parents should understand that such an attitude on their part would stifle the development of personality of their children.

12. For positive mental health one should appreciate the negative effects of fear and advantages of courage and confidence. During times of crises one should not brood over the past or harp over the present trials, but should cultivate the attitude of looking forward to the future. For example, if a person is sick presently, there is no use of brooding over the course of it or worrying over the incapacities that it has brought

about currently. On the other hand, if he pays more attention on the proper medical care and plans as to what he should do to avoid the recurrence of the same in future that will be more helpful.

13. Another important factor to keep oneself mentally healthy is to have somebody, a trusted friend or a reliably elderly person to whom he can confide and converse freely and express his problems and difficulties. When he expresses such personal problem to somebody who is warm, understanding and kind, he feels that his burden is lightened. He will also find that such verbalisation of his difficulties throws some light on the causes of the problem and in the course of time certain possible solution to them might also be suggested.

The adoption of the principles stated above will go a long way in making one's life happy and wholesome. Besides, if one feels that he suffers from some kind of psychological difficulty, for which he needs some external technical help, he can refer himself to a mental health specialist like that of a psychologist. One should not feel hesitant or ashamed for obtaining psychological help when needed, in the same manner as he goes to a physican for consultation, when he is feeling sick. Your willingness to seek psychological help is the sign of your understanding that prevention is better than cure.

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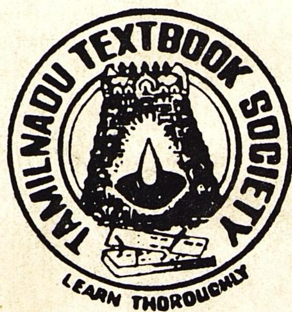
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